

Maine Medical Center East Tower

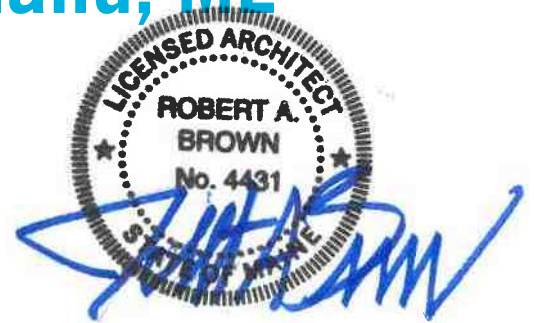
22 Bramhall Street, Portland, ME

PROJECT MANUAL VOLUME 1

Specification Divisions 00 - 14

Construction Documents, 26 January 2018

Project # 152181.000



PERKINS+WILL

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INSURERS REQUIREMENTS

- 1.1 The Owner's Property Insurance Carrier is F. M. Global.
- A. Conform to F.M. Global Standards and Approval Requirements in this Section and in Sections of Divisions 02 through 28.
- B. The following F.M. Global Standards are included in this Specification Section. Copies are available from FM Global's website:
<http://www.fmapprovals.com/approval-standards>
1. Approval Standard for Fire Doors, Class Number 4100, October 1988.
 2. Approval Standard for Windstorm Resistant Fenestrations, Class Number 4350, September 2006.
 3. Approval Standard for Insulated Wall Construction, Class Number 4411, September 1974.
 4. Approval Standard for Roof Perimeter Flashing, Class Number 4435, August 2004.
 5. Approval Standard for Class 1 Fire Rating of Insulated Wall or Wall and Roof Ceiling Panels, Interior Finish Material or Coatings and Exterior Wall Systems, Class Number 4880, May 2010.
 6. Approval Standard for Firestopping, Class Number 4990, December 2009.

END OF DOCUMENT

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SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed for certain work defined that may be added to or deducted from the Base amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 01 TRIPLE PANE GLAZING/REDUCED RADIATION:
1. Base Bid:
 - a. Provide Base Bid dual pane insulated glass units indicated in the Specifications.
 - b. Provide Base Bid radiant heating panels indicated on the Drawings, and in the Specifications.
 - c. References:
 - 1) Specifications:
 - a) Section 08 44 13 "Glazed Aluminum Curtain Walls."
 - b) Section 08 80 00 "Glazing."
 - c) Section 23 83 23 "Radiant-Heating Panels."
 - 2) Drawings: M13-61, M13-62, M13-71, and M13-72
 2. Alternate:
 - a. Provide Alternate curtain wall framing indicated in the Specifications.
 - b. Provide Alternate triple pane insulating units indicated in the Specifications.
 - c. Provide Alternate reduced number of radiant heating panels as indicated on the Drawings.
 - d. References:
 - 1) Specifications:
 - a) Section 08 44 13 "Glazed Aluminum Curtain Walls."
 - b) Section 08 80 00 "Glazing."
 - c) Section 23 83 23 "Radiant-Heating Panels."
 - 2) Drawings: M13-61, M13-62, M13-71, and M13-72
- B. Alternate No. 02 DUAL ROLLER WINDOW SHADES:
1. Base Bid: Provide Manufacturer and Product indicated in the Specifications.
 - a. References:
 - 1) Specifications: Section 12 24 13 "Roller Window Shades."
 2. Alternate: Provide dual roller window shades manufactured by the base bid manufacturer indicated in the Specifications.
 - a. References:
 - 1) Specifications: Section 12 24 13 "Roller Window Shades."
- C. Alternate No. 03 ROLLER WINDOW SHADE ALTERNATE MANUFACTURER:
1. Base Bid: Provide Manufacturer and Product indicated in the Specifications.
 - a. References:
 - 1) Specifications: Section 12 24 13 "Roller Window Shades."
 2. Alternate: Provide Alternate Manufacturer and Product indicated in the Specifications.
 - a. References:
 - 1) Specifications: Section 12 24 13 "Roller Window Shades."

- D. Alternate No. 04 DUAL ROLLER WINDOW SHADES ALTERNATE MANUFACTURER:
1. Base Bid: Provide Manufacturer and Product indicated in the Specifications.
 - a. References:
 - 1) Specifications: Section 12 24 13 "Roller Window Shades."
 2. Alternate: Provide dual roller window shades manufactured by the alternate manufacturer indicated in the Specifications.
 - a. References:
 - 1) Specifications: Section 12 24 13 "Roller Window Shades."
- E. Alternate No. 05 REDUNDANT SNOW MELT HEAT EXCHANGER:
1. Base Bid: Provide snowmelt heat exchanger as indicated on the Drawings and in the Specifications.
 - a. References:
 - 1) Specifications: Section 23 57 00 "Heat Exchangers for HVAC."
 - 2) Drawings: M00-12, M00-31 and M13-51
 2. Alternate:
 - a. Provide Alternate redundant snowmelt heat exchanger as indicated on the Drawings and in the Specifications.
- F. Alternate No. 6A GLASS WITH INTERNAL BLINDS FOR ICU/CCU DOORS:
1. Base Bid: Provide ICH/CCU Doors with horizontal muntin bars, and laminated glass Type GL-30, as specified.
 - a. References:
 - 1) Specifications:
 - a) Section 08 42 43 "Intensive Care Unit-Critical Care Unit Entrances"
 - b) Section 08 80 00 "Glazing."
 2. Alternate: Provide ICH/CCU Doors without horizontal muntin bars, and with Alternate insulating glass Type GL-31, with internal blinds as specified.
 - a. References:
 - 1) Specifications:
 - a) Section 08 42 43 "Intensive Care Unit-Critical Care Unit Entrances"
 - b) Section 08 80 00 "Glazing."
- G. Alternate No. 6B SWITCHABLE ELECTROCHROMIC PRIVACY GLASS FOR ICU/CCU DOORS:
1. Base Bid: Provide ICH/CCU Doors with horizontal muntin bars, and laminated glass Type GL-30, as specified.
 - a. References:
 - 1) Specifications:
 - a) Section 08 42 43 "Intensive Care Unit-Critical Care Unit Entrances"
 - b) Section 08 80 00 "Glazing."
 2. Alternate: Provide ICH/CCU Doors without horizontal muntin bars, and with Alternate switchable electrochromic privacy glass Type GL-32, as specified.
 - a. References:
 - 1) Specifications:
 - a) Section 08 42 43 "Intensive Care Unit-Critical Care Unit Entrances"
 - b) Section 08 88 36 "Switchable Glass."

- H. Alternate No. 6C DECORATIVE GLASS FILM FOR ICU/CCU DOORS:
1. Base Bid: Provide ICH/CCU Doors with horizontal muntin bars, and laminated glass Type GL-30, as specified.
 - a. References:
 - 1) Specifications:
 - a) Section 08 42 43 "Intensive Care Unit-Critical Care Unit Entrances"
 - b) Section 08 80 00 "Glazing."
 2. Alternate: Provide ICH/CCU Doors with horizontal muntin bars, and laminated glass Type GL-32, as specified, and add decorative glazing film.
 - a. References:
 - 1) Specifications:
 - a) Section 08 42 43 "Intensive Care Unit-Critical Care Unit Entrances"
 - b) Section 08 80 00 "Glazing."
 - c) Section 08 81 13 "Decorative Glass Glazing"

I. Alternate No. 7 CUBICAL CURTAIN AT ICU/CCU DOOR ENTRIES.

 1. Base Bid: Cubical Curtains as shown and specified.
 - a. References:
 - 1) Specifications: Section 10 21 23 "Cubical Curtains"
 - 2) Drawings: A12-61, A12-62, A12-71, A12-72
 2. Alternate: Add Alternate Cubical Curtains at ICU/CCU Entrance Doors, as shown and specified.
 - a. References:
 - 1) Specifications: Section 10 21 23 "Cubical Curtains"
 - 2) Drawing: 2/A18-01

END OF SECTION

SECTION 01 43 39

ROOM MOCKUP REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Administrative and procedural requirements for room mockups.
2. Schedule for Room Mockups.

B. Related Sections:

1. Section 01 40 00 "Quality Control."
2. Section 01 45 34 "Mockups for Exterior Wall Systems."
3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
4. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
5. Section 03 33 00 "Cast-In-Place Concrete."
6. Section 05 50 00 "Metal Fabrications."
7. Section 06 10 53 "Miscellaneous Rough Carpentry."
8. Section 06 41 16 "Plastic-Laminate-Faced Architectural Cabinets."
9. Section 06 83 16 "Fiberglass Reinforced Plastic Laminate Paneling."
10. Section 07 92 00 "Joint Sealants."
11. Section 08 11 16 "Aluminum Doors And Frames."
12. Section 08 14 16 "Flush Wood Doors."
13. Section 08 42 43 "Intensive Care Unit/Critical Care Unit (ICU/CCU) Entrances."
14. Section 08 71 00 "Door Hardware."
15. Section 08 80 00 "Glazing."
16. Section 09 22 16 "Non-Structural Metal Framing."
17. Section 09 29 00 "Gypsum Board."
18. Section 09 30 13 "Ceramic Tiling."
19. Section 09 51 13 "Acoustical Panel Ceilings."
20. Section 09 65 13 "Resilient Base And Accessories."
21. Section 09 65 16 "Resilient Sheet and Tile Flooring."
22. Section 09 91 23 "Interior Painting."
23. Section 10 11 10 "Visual Display Surfaces."
24. Section 10 21 23 "Cubicle Curtains And Tracks."
25. Section 11 70 05 "Medical Equipment."
26. Section 12 24 13 "Roller Window Shades."
27. Section 12 36 61 "Simulated Stone Countertops."
28. Division 23 Sections for plumbing fixtures.
29. Division 26 Sections for electrical devices and lighting.

1.2 DEFINITIONS

- A. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- B. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; sinks; medical gas outlets and valves; electrical power outlets; furnishings; equipment; and lighting.

1.3 ACTION SUBMITTALS

- A. Mockup Plan: Indicating proposed locations of mockups.
1. Locate mockups where they will not interfere with the progress of Construction.
- B. Mockup Shop Drawings:
1. For exterior masonry wall construction mockup.
 2. For each room mockup, indicating components, and their arrangements, include plans, elevations, sections, and details.

1.4 QUALITY ASSURANCE

- A. Preconstruction Conference: Prior to constructing mockups:
1. Meet with Owner, Construction Manager, Architect, Installers, and equipment manufacturer's representatives.
 2. Review methods and procedures related to mockup installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review locations of installation for conditions and finishes, including flatness and fastening.
 5. Review governing regulations and requirements for insurance and certificates if applicable.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 INSTALLATION

1. Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish.

2. Build mockups of size and profiles indicated, or if not indicated, as directed by the Architect.
3. Notify Architect and Construction Manager 7 days in advance of the time mockups will be constructed.
4. Employ supervisory personal to oversee mockup construction. Construct the mockups using the same workers who will be used to construct the Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Commence the Work after mockup has been inspected and approved in writing by the Architect.
7. Mockups will establish the standard of workmanship quality by which the Project will be judged.
8. Maintain mockups during construction in an undisturbed condition as a standard for judging completed Work. Failure to maintain the mockup, until directed, will be cause for rejection of Work.
9. Demolish and remove mockups when directed by the Architect.

3.2 ROOM MOCKUP SCHEDULE

- A. Coordinate locations of Room Mockups with the Owner and Construction Manager.
- B. Patient Room:
 1. One complete patient room, and toilet (patient) with all finishes installed for Owner and Architect's review.
 2. Fixtures: Install plumbing and electrical fixtures.
 - a. Fixtures need not be operational for mockup.
 3. Equipment: Install OFIC medical equipment.
 - a. Equipment need not be operational for mockup.

END OF SECTION

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SECTION 01 45 34

FIELD MOCKUPS FOR EXTERIOR WALL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies procedures for constructing mockups for exterior wall systems:
1. Integrated Field Visual Mockup.
- B. Sustainable Building Requirements:
1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
1. Section 01 40 00 "Quality Control."
 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 4. Section 03 33 00 "Cast-In-Place Concrete."
 5. Section 05 50 00 "Metal Fabrications."
 6. Section 06 10 53 "Miscellaneous Rough Carpentry."
 7. Section 07 21 00 "Thermal Insulation."
 8. Section 07 27 13 "Modified Bituminous Sheet Air Barriers."
 9. Section 07 42 13.13 "Formed Metal Wall Panels."
 10. Section 07 42 13.13 "Insulated Metal Wall Panels."
 11. Section 07 42 13.23 "Metal Composite Material Wall Panels."
 12. Section 07 62 00 "Sheet Metal Flashings And Trim."
 13. Section 07 71 00 "Roof Specialties."
 14. Section 07 92 00 "Joint Sealants."
 15. Section 08 44 13 "Glazed Aluminum Curtain Wall."
 16. Section 08 80 00 "Glazing."
- D. Related Documents: Drawing Sheet A30-02 for integrated exterior field visual mockup.

1.2 DEFINITIONS

- A. Mockups: Full-size physical assemblies that are constructed either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1.3 SUBMITTALS

- A. Product Data: Make product data submittals for each product included in the mockups. See the related sections listed.
- B. LEED v4 Submittals: Make LEED v4 submittals for each product included in the mockups. See the related sections listed.
- C. Shop drawings: For each mockup, show plans, elevations and details, including thickness of metals and glass, methods of glazing, methods of anchoring, fastening and jointing, finishes of materials, perimeter sealants and other pertinent data and information.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. See the related sections listed in Part 1 of this specification section for materials.

PART 3 - EXECUTION

3.1 EXTERIOR WALL ASSEMBLY MOCK-UP CONSTRUCTION

- A. Construct full size field visual mockups as shown on Architectural Drawings. Provide scope of mock-up to confirm finish selection of glass, principle materials, dimensions, proportions, etc. Include structural supports suitable for the construction of visual mock-ups of the exterior wall construction of the size and configuration indicated. Construct mock-ups by the same Installers that will perform the actual construction.
- B. Mockup Location:
 - 1. Field Visual Mockup: Placement and orientation of the field visual mock-up shall be such that it may be viewed from both the interior and exterior, at various distances and angles, and under natural daylight and artificial lighting conditions. Locate mockup off site in location acceptable to the Owner and Architect, at Owner's warehouse facility.
- C. Transport preassembled components in the same manner as they are to be transported in the actual project conditions.

- D. Field Visual Mockups:
1. Include:
 - a. Exterior finish materials:
 - 1) Include all materials visible on the building façade as indicated on the mockup drawings.
 2. Provide mock-up which accurately represents the job conditions including joints, sealants, and finishes.
 3. Install accessory items which are visible on the exterior wall systems.
 4. Construct mock-ups in strict accordance with reviewed visual mock-up shop drawings. Any deviation from or additions to details shown on drawings are subject to approval.
 5. Mock-ups are subject to observation by Owner, Architect and their Consultants throughout their construction. Provide minimum three weeks' notice before beginning construction of mock-up. Provide materials and personnel for prompt continuous construction of mock-ups. Delays in mock-up construction due to lack of materials or personnel could result in the Contractor being charged for fees and travel expenses of observers.
 6. Mock-ups will be used to demonstrate quality of materials, finish and workmanship.
 7. Approval of mockups is for:
 - a. All visual aspects of the building facade, materials, colors, textures, joints, dimensions, relationships of materials to adjacent and other materials.
 - b. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - c. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 8. At Substantial completion, or at the direction of the Architect, dispose of mock-up in accordance with Section 01 74 19 "Construction Waste Management and Disposal."
- E. Allow sufficient time for all chemically curing sealants to achieve their proper cure as recommended by the manufacturer.

END OF SECTION

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SECTION 01 45 35

QUALITY CONTROL AND ASSURANCE OF AIR BARRIER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Administrative and procedural requirements for accomplishing an airtight building enclosure that controls infiltration and exfiltration of air.
 - 1. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the airtightness of the building enclosure above and below grade are called "the air barrier system." Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect, Building Enclosure Commissioning Provider (BECxP) or Owner.
 - 2. The Contractor is to ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leakage into, or out of, conditioned space is achieved. The air barrier system is to have the following characteristics:
 - a. be continuous, with all joints sealed.
 - b. be structurally supported to withstand expected peak positive and negative air pressures acting on it.
 - c. have airtight, sufficiently flexible and strong connections between the air barrier system in each assembly and penetrations, joints, and transitions, including but not limited to :
 - 1) Existing walls to walls.
 - 2) Walls to windows and door frames.
 - 3) Different wall systems.
 - 4) Walls to roofs, especially at parapets.
 - 5) Walls to floors over unconditioned spaces.
 - 6) Construction, control and expansion joints.
 - 7) Building assemblies to utility, pipe, airtight damper, and duct penetrations.
- B. Building Enclosure Commissioning (BECx), Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- C. Requirements of this section relate to the coordination between Contractors required to provide an airtight building enclosure, customized fabrication and installation procedures, not to the production of prefabricated assemblies or components.

1. Continuity of the air barrier materials and products with joints to provide assemblies. Continuity of all the enclosure assemblies with joints and transition materials to provide a whole building air barrier system.
2. Specific quality-control requirements for individual construction activities are specified in the sections of the specifications. Requirements in those sections may also cover production of standard products. It is the Contractor's responsibility to ensure that each subcontractor is adequately and satisfactorily performing the quality assurance documentation, tests and procedures required by each section.
3. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
4. Requirements for Contractor to provide an airtight building enclosure is not limited by quality-control services required by Architect, Owner, or authorities having jurisdiction and are not limited by provisions of this section.

D. Related Sections:

1. Building Enclosure Commissioning: Section 01 91 19.
2. Building Enclosure Commissioning, Systems to be commissioned: Section 01 91 19A.
3. Sheathing: Section 06 16 00.
4. Thermal insulation: Section 07 21 00.
5. Modified Bituminous-Sheet Air Barriers: Section 07 27 13.
6. Insulated Metal Wall Panels: Section 07 42 13.19.
7. Ethylene-Propylene-Diene-Monomer (EPDM) Roofing: Section 07 53 23.
8. Joint sealant: Section 07 92 00.
9. Expansion Control: Section 07 95 00.
10. Hollow Metal Doors and Frames: Section 08 11 13.
11. Aluminum curtain walls: Section 08 44 13
12. Fixed Louvers Section 08 91 19

1.2 COSTS OF TESTS

A. Field Tests:

1. The Owner is to pay costs of testing.
2. The Contractor is responsible and is to pay all costs of remedial work and subsequent retesting, and additional testing.

1.3 RESPONSIBILITIES

A. Contractor Responsibilities: The Contractor is to provide coordination of the trades, and the sequence of construction to ensure continuity of the air barrier system joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof. Costs for these services are included in the Contract Sum.

1. Organize preconstruction meetings between the trades involved in the whole building's air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of

- products specified in the different sections, to be installed by the different trades.
2. Facilitate inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction.
- B. Associated Services: Building Enclosure Commissioning Provider (BECxP) and Testing Agency in their performance of required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the (BECxP) and Testing Agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
1. Provide access to the Work.
 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
 4. Deliver samples to testing laboratories as selected by Testing Agency.
 5. Provide security and protection of samples and test equipment at the Project Site
- C. Duties of the Testing and Inspection Agency: All required testing, unless otherwise specified in Part 3 or in the individual BE technical sections (03 to 09), will be performed by an independent third-party testing agency retained by the BECxP. The independent agency will be engaged to perform inspections, sampling, and testing of air barrier materials, components and assemblies specified in individual Sections. Testing agency is to cooperate with the Architect, and the Contractor in performance of the agency's duties. The testing agency is to provide qualified personnel to perform required inspections and tests.
1. The agency is to notify the BECxP, Architect, and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
 3. The agency is not to perform any duties of the Contractor.
- D. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 PERFORMANCE REQUIREMENTS

- A. Compliance Alternatives:
1. Adhesion: WHAT IS STANDARD???
 2. Water Penetration: No evidence of water penetration when tested in accordance with ASTM E 1105, modified, (prior to insulation installation).
 3. Assemblies of materials and components in opaque assemblies are to have an air permeance not to exceed 0.04 cfm/ft² under a pressure differential of 0.3

- in. water gauge (1.57psf) (0.2 L/s*m² @ 75 Pa) when tested in accordance with ASTM E 2357 or ASTM E 283.
4. The air leakage rate of the Building is not to exceed 0.4 cfm/ft² under a pressure differential of 0.3 in. water gauge (1.57psf) (2.0 L/s*m² @ 75 Pa) when tested according to ASTM E 779 or ASTM E 1827 or CGSB 149.15.

1.5 SUBMITTALS

- A. The independent Testing Agency is to submit a certified written report, in duplicate, of each inspection, test, or similar service to the Owner Architect and Construction Manager.
 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
 - a. Date of issue.
 - b. Project title, location, and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample taking and testing.
 - k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
 - l. Name and signature of laboratory inspector.
 - m. Recommendations on retesting.

PART 2 - PRODUCTS

- A. Refer to related sections for elements of Air Barrier System.

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.2 TESTING AND INSPECTION

- A. The Owner will hire a competent Third Party Testing and Inspection Agency to perform quality control. This agency will provide Occasional observation and inspection during installation of the air barrier system.
- B. The testing and inspection agency is to provide the following listed services:
1. Testing and Inspection:
 - a. Provide daily reports of observations, with copies to the Owner, Contractor and Architect and Construction Manager.
 - b. Conduct a qualitative evaluation of the continuity of the air barrier system throughout the building enclosure with no gaps, holes.
 - c. Conduct a qualitative evaluation of the continuity of the structural support of the air barrier system to withstand design air pressures.
 - d. Inspect masonry and concrete surfaces to confirm they are smooth, clean and free of cavities, protrusions and mortar droppings.
 - e. Report on site conditions regarding appropriate temperature and dryness of substrates for the application of air barrier materials and sealants
 - f. Compare length of exposure time of materials to ultra-violet deterioration to manufacturers requirements.
 - g. Observe if surfaces are properly primed if required.
 - h. Observe if laps in material are more than or equal to the minimum required by manufacturer, shingled in the correct direction (or mastic applied on exposed edges), and installed with no fishmouths.
 - i. Observe that approved mastic or sealant is applied on cut edges.
 - j. Observe that roller has been used to enhance adhesion as needed.
 - k. Measure application thickness of liquid-applied materials to manufacturer's specifications for the specific substrate and/or confirm the materials used are the same as called for in the specifications
 - l. Indicate if materials used are compatible with others they are in contact with.
 - m. Report that transitions at changes in direction, and structural support at gaps are provided.
 - n. Report that connections between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.
 - o. Confirm that all visible penetrations are sealed.
 2. Perform the following quantitative tests:
 - a. Tests indicated in Section 01 91 19A - Building Enclosure Commissioning Appendix A.
 - b. Provide written test reports of all tests performed, with copies to the BECxP, Owner and Architect.

END OF SECTION

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Support Facilities, including but not limited to the following:
 - 1. Field offices.
 - 2. Storage and fabrication sheds.
 - 3. Temporary paving.
 - 4. Traffic controls.
 - 5. Parking.
 - 6. Dewatering facilities and drains.
 - 7. Project identification and temporary signs.
 - 8. Waste disposal facilities.
 - 9. Lifts and hoists.
 - 10. Temporary elevator usage.
 - 11. Temporary stairs.
 - 12. Construction aids and miscellaneous services and facilities.
- C. Temporary Utilities, including but not limited to the following:
 - 1. Sewers and drainage.
 - 2. Water service and distribution.
 - 3. Sanitary facilities, including toilets and drinking-water facilities.
 - 4. Heating and cooling facilities.
 - 5. Ventilation and humidity control.
 - 6. Electric power service.
 - 7. Lighting.
 - 8. Telephone service.
 - 9. Electronic communications service.
- D. Security and Protection Facilities, including but not limited to the following:
 - 1. Environmental protection.
 - 2. Stormwater control.
 - 3. Pest control.
 - 4. Site enclosure fence.
 - 5. Security enclosure and lockup.
 - 6. Barricades, warning signs, and lights.
 - 7. Temporary means of egress.
 - 8. Covered walkways.
 - 9. Temporary enclosures.
 - 10. Temporary partitions.
 - 11. Temporary fire protection.
- E. Related Requirements:

1. Division 01 Section "Summary of Work" for work restrictions and limitations on utility interruptions.
2. Section 01 73 00 "Execution" for progress cleaning requirements.
3. Divisions 03 through 32 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.
4. Section 01 81 19 "Construction Indoor Air Quality Requirements" for indoor air quality requirements during Construction and for building flush-out or air Quality Testing Requirements, prior to occupancy.

1.2 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, includes as a minimum, the following:
 1. Permanent or temporary roofing is complete, insulated, and weathertight, including parapets and roof edge terminations.
 2. Exterior walls are insulated, weathertight, and UV-resistant.
 3. All openings are closed with permanent construction or substantial weathertight temporary closures.
 4. Permanent enclosure envelope shall be capable of retaining controlled interior temperature and humidity levels.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. Owner's existing System is not to be used to power welders.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistant materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
1. Keep temporary services and facilities clean and neat.
 2. Relocate temporary services and facilities as required by progress of the Work.
 3. At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 50-mm (2-inch), 3.8-mm- (0.148-inch-) thick, galvanized-steel, chain-link fabric fencing; minimum 1.8 m (6 feet) high with galvanized-steel pipe posts; minimum 60-mm- (2-3/8-inch-) OD line posts and 73-mm- (2-7/8-inch-) OD corner and pull posts, with 42-mm- (1-5/8-inch-) OD top rails.
- B. Portable Chain-Link Fencing: Minimum 50-mm (2-inch), 3.8-mm- (0.148-inch-) thick, galvanized-steel, chain-link fabric fencing; minimum 1.8 m (6 feet) high with galvanized-steel pipe posts; minimum 60-mm- (2-3/8-inch-) OD line posts and 73-mm- (2-7/8-inch-) OD corner and pull posts, with 42-mm- (1-5/8-inch-) OD top and bottom rails. Provide concrete bases for supporting posts.
- C. Lumber and Plywood: Comply with requirements in Section [06 10 00 - Rough Carpentry] [06 10 53 Miscellaneous Rough Carpentry].
- D. Gypsum Board: Minimum 12.7 mm (1/2 inch) thick by 1219 mm (48 inches) wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 1396.
1. Provide 5/8 inch thick Type X where fire-rated partitions are required.
- E. Polyethylene Sheet: Reinforced, fire-resistive sheet, 0.25-mm (10-mil) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- F. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 914 by 1624 mm (36 by 60 inches).
- G. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- H. Paint: Comply with requirements in Division 09 Section "Painting."
- I. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, Construction Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 20 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 1.2-m- (4-foot-) square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.
 - 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 20 to 22 deg C (68 to 72 deg F).
 - 6. Lighting fixtures capable of maintaining average illumination of 215 lx (20 fc) at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- C. Drinking-Water Fixtures: Containerized, bottled-water drinking-water units, including paper cup supply.
 - 1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 7.2 to 12.7 deg C (45 to 55 deg F).
- D. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures".

- E. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.
- F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
 - 2. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
 - 4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.

- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
1. Provide rubber hoses as necessary to serve Project site.
 2. As soon as water is required at each level, extend service to form a temporary water- and fire-protection standpipe. Provide distribution piping. Space outlets so water can be reached with a 100-foot (30-m) hose. Provide one hose at each outlet.
 3. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
 4. Provide pumps to supply a minimum of 200-kPa (30-psi) static pressure at highest point. Equip pumps with surge and storage tanks and automatic controls to supply water uniformly at reasonable pressures.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
 3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
 - a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.
 4. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
 - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 7.2 to 12.7 deg C (45 to 55 deg F).
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
1. Maintain a minimum temperature of 10 deg C (50 deg F) in permanently enclosed portions of building for normal construction activities, and 18.3 deg C (65 deg F) for finishing activities and areas where finished Work has been installed.
- F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition

- construction, and continuing until removal of temporary partitions is complete.
2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- H. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
1. Install electric power service underground, unless overhead service must be used.
 2. Install power distribution wiring overhead and rise vertically where least exposed to damage.
 3. Connect temporary service to Owner's existing power source, as directed by electric company officials.
- I. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.
- J. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
 2. Provide warning signs at power outlets other than 110 to 120 V.
 3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
 4. Provide metal conduit enclosures or boxes for wiring devices.
 5. Provide 4-gang outlets, spaced so 30-m (100-foot) extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.
- K. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

2. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
 3. Install lighting for Project identification sign.
- L. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install separate telephone line for each field office and first-aid station.
1. Provide additional telephone lines for the following:
 - a. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone line for each facsimile machine in each field office.
 - c. Provide high-speed internet service for each computer with modem in each field office.
 - d. Provide a separate telephone line for Owner's use.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.
 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- M. Electronic Communication (E-mail) Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.
1. Provide broadband in primary field office.
 2. Provide for connection of communication devices Owner, Architect and Contractor by Wi-Fi, or wired connections.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
 2. Provide construction for temporary offices, shops, and sheds located within construction area or within 9 m (30 feet) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Paved Areas: Construct and maintain temporary paved areas adequate for construction operations. Locate temporary paved areas within construction limits indicated on Drawings.
1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

- C. Temporary Use of Permanent Paved Areas: Locate temporary paved areas in same location as permanent paved areas. Construct and maintain temporary paved areas adequate for construction operations. Extend temporary paved areas, within construction limits indicated, as necessary for construction operations.
 - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 31 20 00 "Earth Moving."
 - 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 - 4. Delay installation of final course of permanent pavement until immediately before Substantial Completion. Repair base-course before installation of final course.

- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.

- E. Parking: Will not be provided for construction personnel.

- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water. Comply with requirements in applicable Division 31 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
 - 3. Remove snow and ice as required to minimize accumulations.

- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.
 - 4. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
 - 5. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.
 - 6. Maintain and touchup signs so they are legible at all times.

- H. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

- I. Janitorial Services: Provide janitorial services on a daily basis for temporary offices, first-aid stations, toilets, wash facilities, lunchrooms, and similar areas.
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- K. Temporary Elevator Use: Refer to Division 14 Elevator Sections for temporary use of elevators.
- L. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
 - 1. Comply with work restrictions specified in Section 01 10 00 "Summary."
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of

pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

- F. Site Enclosure Fence: Before construction operations begin, install chain-link enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
 - 1. Set fence posts in compacted mixture of gravel and earth.
 - 2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
 - 3. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- J. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
 - 1. Construct covered walkways using scaffold or shoring framing.
 - 2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 - 3. Paint and maintain appearance of walkway for duration of the Work.
- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Vertical Openings: Close openings of 2.3 sq. m (25 sq. ft.) or less with plywood or similar materials.
 - 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 - 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
 - 5. Where temporary wood or plywood enclosure exceeds 9.2 sq. m (100 sq. ft.) in area, use fire-retardant-treated material for framing and main sheathing.

- L. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate occupied areas from fumes and noise.
1. Construct non-fire-rated dustproof partitions of not less than nominal 100-mm (4-inch) studs, 1/213-mm (-inch) gypsum wallboard with joints taped on occupied side, and 13-mm (1/2-inch) fire-retardant plywood on construction side.
 2. Insulate partitions to control noise transmission to occupied areas.
 3. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 4. Equip partitions with dustproof doors and security locks.
 5. Protect air-handling equipment.
 6. Weatherstrip openings.
 7. Provide walk-off mats at each entrance through temporary partition.
- M. Temporary Fire-Rated Partitions: Where indicated on the Drawings, or required by the Authority Having Jurisdiction, Erect and maintain dustproof fire-rated partitions and temporary enclosures to limit dust and dirt migration and to separate occupied areas from construction, fumes, and noise. Fire-rated partitions shall be provided to separate existing occupied areas from construction areas in accordance with NFPA 241.
1. Construct fire-rated dustproof partitions of not less than nominal 100-mm (4-inch) studs, 1/213-mm (-inch) or 5/8-inch (16 mm) Type X gypsum wallboard on both sides, with joints taped.
 2. Extend partitions up to underside of existing structure to the greatest extent possible.
 3. Insulate partitions to provide noise protection to occupied areas.
 4. Seal joints and perimeter with fire-resistant joint sealant.
 5. Equip partitions with dustproof doors and security locks.
 - a. Protect openings in 1-hour fire-rated partitions with 45-minute hollow metal or solid core wood doors.
 6. Protect air-handling equipment.
 7. Weatherstrip openings.
- N. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - a. Field Offices: Class A stored-pressure water-type extinguishers.
 - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
 - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking.
 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
6. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
7. Prohibit smoking in the building and construction areas.
8. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
9. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
10. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
11. Impairments: Utilize the FM Global Red Tag Permit System for any impairment, regardless of the duration. The Boston Operation's Customer Service Desk, 888-606-4570, should always be notified when installed or existing automatic fire protection systems are impaired. This includes closure of automatic sprinkler control valves, loss of utility or fuel supply to fire pumps, and impairment of special protection systems and water supplies.
12. Hot Works: If possible, avoid hot works by using other methods, if there is a practical and safer way to do the job without hot work. When Hot Works required, control all ignition sources through use of FM Global Hot Works Permit system.
 - a. FM Global Property Loss Prevention Data Sheets 10-3.
 - b. FM Global Hot Work Permit System:
 - 1) The fire safety supervisor confirms the location of the proposed hot work and verifies the applicable precautions on the FM Global Hot Work Permit have been taken prior to allowing the start of any hot work. The fire safety supervisor (or alternate authorized personnel) signs and issues the permit only after all needed fire prevention precautions are implemented and the fire watch is present.
 - 2) The hot work permit is posted in a visible place within the work area. Production employees and supervisors in the area are informed about the hot work activity and the need to support the implemented precautions for this hazardous operation.
 - 3) While the hot work proceeds, the fire watch maintains a constant vigil (even during employee breaks and meal times) to maintain the hot work area in a fire-safe condition, keeps watch for any stray sparks, smoldering fires, or other fire hazards, and is ready to provide the initial fire response.
 - 4) Once the work is completed, the fire watch remains in the area for one hour, and carefully inspects the work and the adjacent areas for smoldering fires. This inspection extends to floors above and

- below the work and adjacent rooms. The fire watch then signs the permit and leaves it posted and informs the fire safety supervisor.
- 5) The hot work area is then monitored for an additional 3 hours after the 1-hour fire watch.
 - 6) When the monitoring period has ended, the fire safety supervisor (or alternate authorized personnel) conduct a final inspection of the area and signs the permit. The permit is removed and may be retained as a record of the work.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Construction Indoor Air Quality Management: Comply with the requirements outlined in Section 01 81 19 - CONSTRUCTION INDOOR AIR QUALITY REQUIREMENTS.
- C. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- D. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- E. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use permanent HVAC system to control humidity.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

- F. Wet and Water-Damaged Materials:
 - 1. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 24 hours are considered defective.
 - 2. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight hour period. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - 3. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

3.7 ATTACHMENTS

- A. FM Global Hot Works Permit.
- B. FM Global "Warning" Hot Works in Progress Watch for Fire.

END OF SECTION

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HOT WORK PERMIT

**BEFORE INITIATING HOT WORK, CAN THIS JOB BE AVOIDED?
IS THERE A SAFER WAY?**

This Hot Work Permit is required for any temporary operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Torch Applied Roofing and Welding.

INSTRUCTIONS

1. Firesafety supervisor:

- A. Verify precautions listed at right (or do not proceed with the work).
- B. Complete and retain Part 1.
- C. Issue Part 2 to person doing job.

HOT WORK BEING DONE BY

EMPLOYEE

CONTRACTOR _____

DATE

JOB NUMBER

LOCATION/BUILDING AND FLOOR

NATURE OF JOB

NAME OF PERSON DOING HOT WORK

I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED (Firesafety Supervisor/Operations Supervisor)

**PERMIT
EXPIRES**

DATE

TIME

AM
PM

NOTE: EMERGENCY NOTIFICATION ON BACK OF FORM. USE AS APPROPRIATE FOR YOUR FACILITY.

PART 1

REQUIRED PRECAUTIONS CHECKLIST

- Available sprinklers, hose streams and extinguishers are in service/operable.
- Hot Work equipment in good repair.

Requirements within 35 ft (11 m) of work

- Flammable liquids, dust, lint and oily deposits removed.
- Explosive atmosphere in area eliminated.
- Floors swept clean.
- Combustible floors wet down, covered with damp sand or fire-resistive sheets.
- Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields.
- All wall and floor openings covered.
- Fire-resistive tarpaulins suspended beneath work.
- Protect or shut down ducts and conveyors that might carry sparks to distant combustibles.

Work on walls, ceilings or roofs

- Construction is noncombustible and without combustible covering or insulation.
- Combustibles on other side of walls, ceilings or roofs are moved away.

Work on enclosed equipment

- Enclosed equipment cleaned of all combustibles.
- Containers purged of flammable liquids/vapors.
- Pressurized vessels, piping and equipment removed from service, isolated and vented.

Fire watch/Hot Work area monitoring

- Fire watch will be provided during and for 60 minutes after work, including any coffee or lunch breaks.
- Fire watch is supplied with suitable extinguishers, and where practical, a charged small hose.
- Fire watch is trained in use of equipment and in sounding alarm.
- Fire watch may be required in adjoining areas, above and below.
- Monitor Hot Work area for 4 hours after job is completed.

Other Precautions Taken:

FM Global

WARNING!

HOT WORK IN PROGRESS WATCH FOR FIRE!

INSTRUCTIONS

1. **Person doing Hot Work:** Indicate time started and post permit at Hot Work location. After Hot Work, indicate time completed and leave permit posted for Fire Watch.
2. **Fire Watch:** Prior to leaving area, do final inspection, sign, leave permit posted and notify Firesafety Supervisor.
3. **Monitor:** After 4 hours, do final inspection, sign and return to Firesafety Supervisor.

HOT WORK BEING DONE BY

EMPLOYEE

CONTRACTOR _____

DATE _____

JOB NUMBER _____

LOCATION/BUILDING AND FLOOR _____

NATURE OF JOB _____

NAME OF PERSON DOING HOT WORK _____

I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED (Firesafety Supervisor/Operations Supervisor) _____

TIME STARTED _____

TIME FINISHED _____

AM PM

AM PM

**PERMIT
EXPIRES**

DATE _____

TIME _____

AM
PM

FIRE WATCH SIGNOFF:

Work area and all adjacent areas to which sparks and heat might have spread were inspected during the watch period and were found fire safe.

Signed: _____

FINAL CHECKUP:

Work area was monitored for 4 hours following Hot Work and found fire safe.

Signed: _____

PART 2

REQUIRED PRECAUTIONS CHECKLIST

- Available sprinklers, hose streams and extinguishers are in service/operable.
- Hot Work equipment in good repair.

Requirements within 35 ft (11 m) of work

- Flammable liquids, dust, lint and oily deposits removed.
- Explosive atmosphere in area eliminated.
- Floors swept clean.
- Combustible floors wet down, covered with damp sand or fire-resistive sheets.
- Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields.
- All wall and floor openings covered.
- Fire-resistive tarpaulins suspended beneath work.
- Protect or shut down ducts and conveyors that might carry sparks to distant combustibles.

Work on walls, ceilings or roofs

- Construction is noncombustible and without combustible covering or insulation.
- Combustibles on other side of walls, ceilings or roofs are moved away.

Work on enclosed equipment

- Enclosed equipment cleaned of all combustibles.
- Containers purged of flammable liquids/vapors.
- Pressurized vessels, piping and equipment removed from service, isolated and vented.

Fire watch/Hot Work area monitoring

- Fire watch will be provided during and for 60 minutes after work, including any coffee or lunch breaks.
- Fire watch is supplied with suitable extinguishers, and where practical, a charged small hose.
- Fire watch is trained in use of equipment and in sounding alarm.
- Fire watch may be required in adjoining areas, above and below.
- Monitor Hot Work area for 4 hours after job is completed.

Other Precautions Taken:

WARNING!

HOT WORK IN PROGRESS WATCH FOR FIRE!

IN CASE OF EMERGENCY:

CALL: _____

AT: _____

WARNING!



SECTION 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.

- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 013300 "Submittal Procedures" for submitting surveys.
 - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
 - 5. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. Products: List products to be used for patching and firms or entities that will perform patching work.

4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the

building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
 - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Section 018113.14 "Sustainable Design Requirements - LEED V4 for New Construction and Major Renovations,"
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examination of the Site and Records of Existing Construction and Conditions: Examine the site, the records of existing construction, and the conditions under which the Work is to be performed. Notify the Architect immediately if existing conditions discovered will affect the Work as shown on the Contract Documents
- B. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

- C. Conditions Furnished in the Contract Documents: The Contract Documents are based upon the information furnished to the Architect by the Owner. Such information is available from the Owner. The records are furnished for information only and may not represent all conditions that will be encountered. The records of existing construction represent conditions known to the Owner. Other construction, of which no records are available, may be encountered. Dimensions of existing construction are based on information provided to the Architect by the Owner. The Contractor and each subcontractor shall field verify dimensions of existing conditions.
- D. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- E. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- F. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Construction Manager that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.
- B. General: Construction Manager will lay out the Work.
 - 1. Owner will establish benchmarks and control points and Construction Manager will establish set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

- C. Benchmarks: Owner will establish and Construction Manager will maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces, unless otherwise indicated on the Drawings.
- B. Precautions Against Movement or Settlement: The Contractor shall take precautions, including bracing, shoring, underpinning, or other retaining structures, to guard against movement or settlement of existing or new construction. Assume responsibility for the design, safety, and support of such construction, and for movement, settlement, damage, or injury resulting from the construction.
1. Monitoring of existing buildings during demolition and piling installation will be monitored for movement and vibration by the Owner.
 2. Should the Contractor be notified that the movement, or vibration has exceeded the limits established, he shall cease Work immediately, correct any damage to existing structures and provide a plan to proceed with the Work without exceeding the limits.
- C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- F. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- G. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- H. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- I. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- J. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
 - 1. Comply with requirements of the Authority Having Jurisdiction and the Impairment Plan.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed

procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - a. Remove or cut off brick ties.
 - b. Protect Backup wall assembly, Insulation, flashings and wall membranes.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
 6. Exterior Brick:
 - a. Repair damage to backup wall assembly.
 - 1) Cold Formed Metal Framing.

- 2) Sheathing.
- 3) Air or water barrier.
- 4) Insulation.
- 5) Flashing.
- b. Replace brick with salvaged brick. Or if brick cannot be salvaged, with brick matching exactly the existing brick.
- c. Match existing mortar color.
- d. Replace sealants to match existing material and color.

- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

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SECTION 01 81 13

SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) **Silver** certification level based on USGBC's LEED v4 BD+C.
1. Specific requirements for LEED are also included in other Sections.
 2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
 3. Some LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.
 4. Any discrepancies between the LEED Requirements in this Section and those in other Sections require notification of the Architect and the Architect's approval of the resolution.
 5. A copy of the LEED Project checklist is attached at the end of this Section for information only.
- B. The Owner requires the Contractor to implement practices and procedures to meet the project's performance goals, for the East Tower 6 & 7 Addition, and for the Congress Street Building, which include achieving LEED v4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
1. Section 01 74 19 – Construction and Demolition Waste Management and Disposal
 2. Division 02 through 12 Sections for LEED requirements specific to the Sections.

1.2 DEFINITIONS

- A. LEED: USGBC's "LEED Version 4 for Building Design and Construction."

1. Definitions that are a part of "LEED Version 4 for Building Design and Construction" (LEED v4 BD+C) apply to this Section.
- B. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- C. Chlorofluorocarbons (CFCs): Hydrocarbons that deplete the stratospheric ozone layer.
- D. Composite wood: Consists of wood or plant particles or fibers bonded by a synthetic resin or binder. Examples include particleboard, medium-density fiberboard (MDF), plywood, oriented-strand board (OSB), wheatboard, and strawboard.
- E. Composite Wood Evaluation: Composite wood, as defined by the "California Air Resources Board, Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products" Regulation, which has been documented to have low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde (NAF) resins.
- F. Declare Product Label: Products with a Declare transparency label that indicates all ingredients have been evaluated and disclosed down to 1,000 ppm as administered by the International Living Futures Institute (<http://living-future.org>).
- G. Environmental Product Declaration (EPD):
 1. Product-specific declaration: Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope are valued as one quarter (1/4) of a product for the purposes of credit achievement calculation.
 2. Environmental Product Declarations which conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
 - a. Industry-wide (generic) EPD -- Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator are valued as one half (1/2) of a product for purposes of credit achievement calculation.
 - b. Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator are valued as one whole product for purposes of credit achievement calculation.
- H. Extended Producer Responsibility (EPR): Program implemented by a product manufacturer to accept its own and sometimes other manufacturers' products as postconsumer waste at the end of the products' useful life. Alternatively known as a manufacturer's take-back program.

- I. Forest Stewardship Council (FSC) is an independent, non-governmental, not for profit organization established to promote the responsible management of the world's forests. FSC provides certifications to award forest managers who adopt environmentally and socially responsible forest management practices and to companies that manufacture and sell products that directly support responsible forest management.
- J. Furniture: For the purposes of LEED credits, furniture and furnishings:
 - 1. Include the stand-alone furniture items purchased for the Project, including individual and group seating; open-plan and private-office workstations; desks and tables; storage units, credenzas, bookshelves, filing cabinets, and other case goods; wall-mounted visual-display products (e.g., marker boards and tack boards) and miscellaneous items, such as easels, mobile carts, freestanding screens, installed fabrics, and movable partitions. Hospitality furniture is included as applicable to the Project.
 - 2. Exclude electronic displays; office accessories, such as desktop blotters, trays, tape dispensers, waste baskets; and all electrical items, such as lighting and small appliances.
- K. Furniture Evaluation: New furniture and furnishing items tested in accordance with ANSI/BIFMA Standard Method M7.1–2011 and compliant with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach. Testing must be modeled using the open plan, private office, or seating scenario in ANSI/BIFMA M7.1, as appropriate. For classroom furniture, use the standard school classroom model in California Dept. of Public Health (CDPH) Standard Method v1.1. Documentation submitted for furniture must indicate the modeling scenario used to determine compliance.
- L. General Emissions Evaluation: Building product testing in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario. The default scenario is the private office scenario. The manufacturer's or third-party certification must state the exposure scenario used to determine compliance. Claims of compliance for wet-applied products must state the amount applied in mass per surface area. Manufacturers' claims of compliance with the above requirements must also state the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Method v1.1: 0.5 mg/m³ or less; between 0.5 and 5.0 mg/m³; or 5.0 mg/m³ or more.
- M. Health Product Declaration (HPD): Products with a published, complete HPD with full disclosure of known hazards and residuals disclosure at no less stringent than 1,000 parts per millions (ppm), in compliance with the Health Product Declaration Open Standard as maintained by the Health Product Declaration Collaborative (www.hpd-collaborative.org).
- N. Hydrochlorofluorocarbons (HCFCs): Refrigerants used in building equipment that deplete the stratospheric ozone layer, but to a lesser extent than CFCs.
- O. Inherently Non-emitting Materials: Naturally occurring materials and products made from inorganic materials that emit either very low or no VOCs. Products that are inherently non-emitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or

untreated solid wood flooring) are considered fully compliant with the Low-Emitting Materials credit without any VOC emissions testing, if they do not include integral organic based surface coatings, binders, or sealants.

- P. Life Cycle Assessment: An evaluation of the environmental effects of a product from cradle (resource extraction) to grave (product disposal), as defined by ISO 14040–2006 and ISO 14044–2006.
- Q. Material Cost: For the purposes of LEED calculations and tracking, the dollar value of a product furnished for the Project including the cost of materials, shop labor, Contractor markups, taxes, fees, delivery costs, and all expenses incurred by the Contractor to bring the product to the Project site. Material cost excludes any cost for site labor and site equipment required for installation on the Project site.
- R. Point of Harvest/Extraction/Recovery: Location where raw material is gathered for use in production.
- S. Point of Manufacturing (Final Assembly): Location where individual components are assembled into a product that is furnished and installed on site.
- T. Point of Purchase: Location of the purchase transaction for a product. For online or other transactions that do not occur in person, the point of purchase is considered the location of product distribution.
- U. Pre-Consumer Recycled Content: Defined as material diverted from the waste stream during the manufacturing process. Examples in this category include planer shavings, plytrim, sawdust, chips, bagasse, sunflower seed hulls, walnut shells, culls, trimmed materials, print overruns, over-issue publications, and obsolete inventories. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it. (Previously referred to as Post-industrial Content.)
- V. Post-Consumer Waste: Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of materials from the distribution chain. Examples of this category include construction and demolition debris, materials collected through curbside and drop-off recycling programs, broken pallets, discarded products (e.g., furniture, cabinetry and decking) and urban maintenance waste (e.g., leaves, grass clippings, tree trimmings, etc.).
- W. Solar Reflectance Index (SRI): A measure of a material's ability to reject solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.9) is equal to 0, and a standard white (reflectance 0.80, emittance 0.90) is equal to 100.
- X. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

- Y. Note that LEED uses the term "preconsumer" rather than "postindustrial." Also note that when manufacturers and trade associations use the term "postindustrial," it often includes spills, scraps, and damaged and surplus materials that are fed back into the same manufacturing process and that these materials are not considered recycled content by the LEED Rating Systems.
 - Z. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
 - AA. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
 - BB. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.
 - CC. Vendor: A Vendor of certified wood is the organization that sells/supplies wood products to contractors or subcontractors. A vendor must have a FSC Chain of Custody (CoC) certificate if it is selling FSC-certified products for which its packaging or form will be modified and/or products that are not individually labeled; this includes most lumber.
 - DD. Volatile Organic Compounds (VOCs): Carbon compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate). The compounds vaporize (become a gas) at normal room temperatures
- 1.3 PREINSTALLATION MEETINGS
- A. Preinstallation Conference: Conduct conference at Project site. Review LEED requirements and action plans for meeting requirements.
- 1.4 ADMINISTRATIVE REQUIREMENTS
- A. Respond to questions and requests from Architect and the USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application. Document responses as informational submittals.
 - B. Submit documentation to USGBC and respond to questions and requests from USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application.
 - 1. Document correspondence with USGBC as informational submittals.

1.5 SUBMITTALS GENERAL

- A. General: Submit additional sustainable design submittals required by other Specification Sections.
- B. Sustainable design submittals are in addition to other submittals.
 - 1. If submitted item is identical to that submitted to comply with other requirements, include an additional copy with other submittal as a record copy of compliance with indicated LEED requirements instead of separate sustainable design submittal. Mark additional copy "Sustainable design submittal."
- C. Projects seeking LEED certification must track and record product, material, and cost information for LEED credit documentation. The contractor shall complete and submit the following forms included with product submittals:
 - 1. Low-Emitting Materials Reporting Form: for all permanently installed products and materials related to the work of any Section installed on the interior of the building (i.e. inside the weatherproofing system) and falling within one of the product categories listed below. The Contractor shall submit:
 - a. Completed Low-Emitting Materials Reporting Form. A sample Form for this project has been included in the Appendix of this Section.
 - b. For each building product and material listed on the Form, provide information and support documentation for the product as defined in this Section to support all environmental claims listed in the Form. Submittal requirements for the support documentation can be found in the "LEED Credit-Specific Submittal" part of this Section.
 - c. Applicable product categories: flooring; composite wood; ceilings, walls, and thermal or acoustic insulation; field-applied adhesives, sealants, paints, and coatings; and furniture products.
 - 2. BPDO Materials Reporting Form: for all permanently installed products and materials specified in CSI MasterFormat 2012 Edition Divisions 03-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Pavings, Site Improvements, and Planting). The Contractor shall submit:
 - a. Completed BPDO Materials Reporting Form. A sample Form for this project has been included in the Appendix of this Section.

1.6 ACTION SUBMITTALS

- A. LEED Materials Tracking Submittals:
 - 1. The contractor shall complete a LEED v4 Building Product Disclosure + Optimization (BPDO) Calculator for products in CSI MasterFormat 2012 Edition Divisions 03-12, according to the following schedule and requirements:
 - a. A Sample BPDO Calculator has been included in the Appendix of this Section. This sample is provided for reference only as the required file is editable. The BPDO Calculator is available for download at <http://www.usgbc.org/resources/bpdo-calculator> or upon request.
 - b. At the commencement of construction, submit a BPDO Calculator with the Project specification sections shown congruously with the

- anticipated submittal log and with preliminary materials cost column completed.
- c. On a monthly basis during construction, update and submit the BPDO Calculator with actual product data and cost information from approved LEED Product Submittals.
 - d. At substantial completion, submit a final and complete BPDO Calculator with required product data and cost data.
2. The Contractor shall complete a LEED v4 Low-Emitting Materials Calculator for permanently installed interior products related to the work of any Section, for the applicable product categories outlined in the LEED Product Submittals of this Section.
 - a. A Sample Low-Emitting Materials Calculator has been included in the Appendix of this Section. This sample is provided for reference only as the required file is editable. The Low-Emitting Materials Calculator is available for download at <http://www.usgbc.org/resouces/low-emitting-materials-calculator>, or upon request.
 - b. On a monthly basis during construction, update and submit the Low-Emitting Materials Calculator with actual product data from approved LEED Product Submittals.
 - c. At substantial completion, submit a final and complete Low-Emitting Materials Calculator with required product data.
- B. LEED Credit-Specific Submittals:
1. For detailed explanation of credit requirements, refer to LEED v4 BD+C Reference Guide.
 2. For all MR Credits Building Product Disclosure and Optimization (BPDO) listed below:
 - a. Submittals apply to permanently installed products and materials specified in CSI MasterFormat 2012 Edition Divisions 3-12.
 - b. For all Credit Options 2 outlined below, submit the following for any regionally sourced products that have raw materials extracted and are manufactured and purchased/distributed within 100 mile radius of the Project site: Cut sheet or a written affidavit from the manufacturer indicating,
 - 1) Location (city, state) for points of raw material extraction, product manufacturing (final assembly), and product purchase/distribution.
 - 2) Breakdown of product component materials which are extracted, manufactured, and purchased within 100 miles of the project site and the material percentage of each component by weight.
 - 3) Distance in miles from the Points of raw material extraction, product manufacturing, and product purchase/distribution to the Project site location, measured as the most direct route between points.
 3. Low-Emitting Materials, submittals apply to permanently installed products and materials related to the work of any Section on the interior of the building (i.e. inside the weatherproofing systems) and falling within one of the applicable product categories.
 - a. Applicable product categories are listed under "LEED Product Submittals" under the Submittals part of this Section.

- b. Note that LEED v4 publishes a list of approved third-party product certifications and labels, available for download at <http://www.usgbc.org/resources/low-emitting-material-third-party-certification-table>.
 4. For further explanation of credit requirements, refer to LEED v4 BD+C Reference Guide.
- C. Sustainable Design Documentation Submittals:
 1. Environmental Product Declarations complying with LEED requirements.
 2. Documentation for products that comply with LEED requirements for multi-attribute optimization.
 - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
 3. Sustainability reports for products that comply with LEED requirements for raw material and source extraction reporting.
 4. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting.
 5. Documentation for products that comply with LEED requirements for material ingredient optimization.
 6. Documentation complying with Section 01 74 19 "Construction Waste Management and Disposal."
 7. Product data for adhesives and sealants used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
 8. Product data for paints and coatings used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
 9. Laboratory test reports for flooring, indicating compliance with requirements for low-emitting materials.
 10. Laboratory test reports for products containing composite wood or agrifiber products or wood glues, indicating compliance with requirements for low-emitting materials.
 11. Laboratory test reports for ceilings, walls, and thermal insulation, indicating compliance with requirements for low-emitting materials.
 12. Construction Indoor-Air-Quality (IAQ) Management:
 - a. Construction IAQ management plan.
 - b. Product data for temporary filtration media.
 - c. Product data for filtration media used during occupancy.
 - d. Construction Documentation: Six photographs at three different times during the construction period, along with a brief description of the SMACNA approach employed, documenting implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.
 13. Heat Island Reduction: for roof system components, submit cut sheets indicating that materials are Energy Star compliant and meet or exceed the following minimum Solar Reflectance Index (SRI) values. Initial SRI values apply only if three-aged SRI values are not available.
 - a. Low-sloped roof (less than or equal to 2:12): three-year aged SRI of 64 (SRI of 82).

14. Rainwater Management: for stormwater filtration devices, submit cut sheets or a written affidavit from the manufacturer indicating the percentage of Total Suspended Solids (TSS) filtered and the percentage of Total Phosphorus filtered by the devices.
15. Indoor Water Use Reduction: for plumbing fixtures, submit cut sheets with water consumption flow rates highlighted.
16. Construction Indoor Air Quality Management Plan: For submittal requirements, refer to Section 018119 - Construction Indoor Air Quality Requirements.
17. Construction and Demolition Waste Management: For submittal requirements, refer to Section 017419 - Construction and Demolition Waste Management.
18. Construction Activity Pollution Prevention: The Contractor shall implement and document the Project Erosion and Sedimentation Control (ESC) Plan for construction activities associated with the project.
 - a. The documentation shall consist of one (1) or more of the following measures, as determined by the Owner and Architect.
 - 1) The Contractor shall declare the occurrence of periodic inspections throughout the construction process and provide documentation and reporting that the Erosion and Sedimentation Control Plan was executed appropriately. The documentation must include the following:
 - a) Documentation of sample dates.
 - b) Inspection frequency, which shall occur a minimum of once per month.
 - c) Minimum of three (3) inspections equally spaced over the duration of site work.
 - d) Detailed descriptions of corrective actions taken.
 - 2) The Contractor shall provide date-stamped photos which shall document the implemented measures prescribed by the Erosion and Sedimentation Control Plan and document corrective actions taken during construction.
 - 3) The Contractor shall provide a narrative describing the measures taken to implement the Erosion and Sedimentation Control Plan.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For LEED coordinator.
- B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:
 1. Plumbing.
 2. Mechanical.
 3. Electrical.
 4. Specialty items, such as elevators and equipment.
- C. Sustainable Design Action Plans: Provide preliminary submittals within 30 days of date established for commencement of the Work, indicating how the following requirements will be met:
 1. List of proposed products with Environmental Product Declarations.
 2. List of proposed products complying with requirements for raw material and source extraction reporting.

3. List of proposed products complying with requirements for leadership extraction practices.
 4. List of proposed products complying with requirements for material ingredient reporting.
 5. List of proposed products complying with requirements for material ingredient optimization.
 6. List of proposed products complying with requirements for product manufacturer supply chain optimization.
 7. Waste management plan complying with Section 01 74 19 "Construction Waste Management and Disposal."
 8. Construction IAQ management plan.
- D. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.
- E. LEED Submission Documentation:
1. At or before substantial completion, the Contractor shall prepare supporting documentation for each LEED construction prerequisite and credit to be attempted, which have been assigned to the Contractor by the Owner or Architect.
 - a. Architect shall prepare and distribute a LEED v4 Documentation Matrix to the Contractor. The LEED v4 Documentation Matrix illustrates the deliverables required to adequately record that the project has met the intent of each credit.
 - b. Contractor shall register and log-in to LEED Online (<http://www.leedonline.com>).
 - c. Contractor shall complete LEED Online credit forms and upload associated required backup documentation for all the credits assigned in the LEED v4 Documentation Matrix. The LEED Online credit forms shall contain:
 - 1) All proper data fields completed declaring that the project has met the intent of the credit, including narrative(s) when applicable.
 - 2) Electronic signature of Contractor and date signed, where required.
 2. The Contractor shall notify Architect of completion.

1.8 QUALITY ASSURANCE

- A. LEED Coordinator: Engage an experienced LEED-accredited professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to

these LEED credits, the Contractor shall provide additional materials and procedures necessary to obtain LEED credits indicated.

- B. At least 20 different products from at least five different manufacturers shall have Environmental Product Declarations that comply with LEED requirements. Industry-wide (generic) Environmental Product Declarations shall be valued as one-half of a product.
- C. At least 20 different products from at least five different manufacturers shall have publically released reports that comply with LEED requirements for raw material source and extraction reporting. Self-declared reports by manufacturers shall be valued as one-half of a product.
- D. At least 20 different products from at least five different manufacturers shall comply with LEED requirements for material ingredient reporting.
- E. At least 25 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for material ingredient optimization.
- F. At least 25 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for product manufacturer supply chain optimization.
- G. Not less than 25 percent of building materials, by cost, shall comply with LEED requirements for leadership extraction practices.
 - 1. Structure and enclosure materials shall not be more than 30 percent, by cost, of the materials used to comply with this requirement.
- H. Extended Producer Responsibility Program: Not less than 25 percent of building materials, by cost, shall be manufactured by a participant in an extended producer responsibility program.

2.2 LOW-EMITTING MATERIALS

- A. Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 50 g/L.
 - 3. Dry-Fog Coatings: 150 g/L.
 - 4. Primers, Sealers, and Undercoaters: 100 g/L.
 - 5. Rust-Preventive Coatings: 100 g/L.
 - 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
 - 7. Pretreatment Wash Primers: 420 g/L.
 - 8. Clear Wood Finishes, Varnishes: 275 g/L.
 - 9. Clear Wood Finishes, Lacquers: 275 g/L.
 - 10. Floor Coatings: 50 g/L.
 - 11. Shellacs, Clear: 730 g/L.
 - 12. Shellacs, Pigmented: 550 g/L.
 - 13. Stains: 100 g/L.

- B. Paints and Coatings: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Adhesives and Sealants: For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Wood Glues: 30 g/L.
 2. Metal-to-Metal Adhesives: 30 g/L.
 3. Adhesives for Porous Materials (Except Wood): 50 g/L.
 4. Subfloor Adhesives: 50 g/L.
 5. Plastic Foam Adhesives: 50 g/L.
 6. Carpet Adhesives: 50 g/L.
 7. Carpet Pad Adhesives: 50 g/L.
 8. VCT and Asphalt Tile Adhesives: 50 g/L.
 9. Cove Base Adhesives: 50 g/L.
 10. Gypsum Board and Panel Adhesives: 50 g/L.
 11. Rubber Floor Adhesives: 60 g/L.
 12. Ceramic Tile Adhesives: 65 g/L.
 13. Multipurpose Construction Adhesives: 70 g/L.
 14. Fiberglass Adhesives: 80 g/L.
 15. Contact Adhesives: 80 g/L.
 16. Structural Glazing Adhesives: 100 g/L.
 17. Wood Flooring Adhesives: 100 g/L.
 18. Structural Wood Member Adhesives: 140 g/L.
 19. Single-Ply Roof Membrane Adhesives: 250 g/L.
 20. Special-Purpose Contact Adhesives (That Are Used to Bond Melamine-Covered Board, Metal, Unsupported Vinyl, Rubber, or Wood Veneer 1/16 Inch or Less in Thickness to Any Surface): 250 g/L.
 21. Top and Trim Adhesives: 250 g/L.
 22. Plastic Cement Welding Compounds: 250 g/L.
 23. ABS Welding Compounds: 325 g/L.
 24. CPVC Welding Compounds: 490 g/L.
 25. PVC Welding Compounds: 510 g/L.
 26. Adhesive Primer for Plastic: 550 g/L.
 27. Sheet-Applied Rubber Lining Adhesives: 850 g/L.
 28. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.
 29. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.
 30. Special-Purpose Aerosol Adhesives (All Types): 70 percent by weight.
 31. Other Adhesives: 250 g/L.
 32. Architectural Sealants: 250 g/L.
 33. Nonmembrane Roof Sealants: 300 g/L.
 34. Single-Ply Roof Membrane Sealants: 450 g/L.
 35. Other Sealants: 420 g/L.
 36. Sealant Primers for Nonporous Substrates: 250 g/L.
 37. Sealant Primers for Porous Substrates: 775 g/L.
 38. Modified Bituminous Sealant Primers: 500 g/L.
 39. Other Sealant Primers: 750 g/L.

- D. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 90 percent of adhesives and sealants shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Flooring: Flooring shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- F. Composite Wood: Composite wood, agrifiber products, and adhesives shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
- G. Ceilings, Walls, and Thermal Insulation: Ceilings, walls, and thermal insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 NONSMOKING BUILDING

- A. Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

3.2 CONSTRUCTION WASTE MANAGEMENT

- A. Comply with Section 01 74 19 "Construction Waste Management and Disposal."

3.3 CONSTRUCTION IAQ MANAGEMENT

- A. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."
 - 1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Section 01 50 00 "Temporary Facilities and Controls," install MERV 8 filter media at each return-air inlet for the air-handling system used during construction.
 - 2. Replace air filters immediately prior to occupancy.

END OF SECTION

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SECTION 01 91 00

BUILDING SYSTEMS COMMISSIONING REQUIREMENTS

1.1 GENERAL

A. Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
2. Documents referenced in paragraph below should be prepared during schematic design phase or earlier and updated as design progresses. They should be provided to Contractor when commissioning is used on Project.
3. OPR and BoD documentation are included by reference for information only.
4. Commissioning pertains primarily to the work described in Divisions 22, 23, and 26, 28, 38 and shall be included for all systems to be commissioned as specified herein.
5. Commissioning Plan – A Preliminary Commissioning Plan is provided as supplemental information and will guide the commissioning process.

B. Summary

1. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.
2. Related Divisions:
 - a. All sections relating to the Systems to be Commissioned are related to the commissioning requirements and process.
 - b. This includes, but is not limited to all Sections of Divisions 1, 20, 21, 22, 23, 24, 25, 26, 27, 28 and 38.

C. Definitions

1. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor.
2. BoD: Basis of Design: A document, prepared by Architect, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines.
3. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
4. Prefunctional Check-out Documents and Prefunctional Checklists – checklists developed by the CxA, completed by the contractor and verified by the CxA.
5. Contractor: the prime contractor identified in the Contract for Construction between Owner and Contractor.
6. Corrective Action– documentation of an issue identified by the CxA in a Field Report that requires correction and response by the Contractor.
7. CxA: Commissioning Authority.
8. Engineering Professionals: Includes the Engineers identified in the Contract for Construction between Owner and Contractor, responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

9. Functional Performance Testing – the rigorous, documented testing of systems. Tests are developed by the CxA and performed by the Contractor under the supervision of the CxA.
10. Issues Log – log of all CxA identified issues and their status.
11. OPR: Owners Project Requirements: A written document, prepared by Owner that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.
12. Subcontractor: contractors responsible to the Contractor for installation of Systems to be Commissioned.
13. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.
14. Systems to be Commissioned: includes all systems, subsystems and equipment and associated components to be commissioned.
15. TAB: Testing, Adjusting, and Balancing.

D. Commissioning Team

1. The Commissioning Team is organized and lead by the CxA with the support and coordination of the Contractor. Members include:
 - a. Representatives of the CxA
 - b. Representatives of the Owner including facility users and operation and maintenance personnel.
 - c. Architect and engineering design professionals.
 - d. The Contractor Project Manager, Superintendent and other appropriate parties responsible for coordination of other Division activities.
 - e. Subcontractor representatives including the project manager and foreman responsible for installation of systems to be commissioned including, but not limited to:
 - i. Mechanical
 - ii. Controls
 - iii. Plumbing
 - iv. Electrical
 - v. TAB
 - vi. Security
 - vii. Fire Alarm
2. Subcontractor appointed training liaisons.

E. Contractor's Responsibilities

1. Provide utility services required for the commissioning process.
2. Coordinate subcontractor commissioning activities; ensuring all affected trades are provided with the documentation necessary for the completion of their commissioning scope.
3. Provide the CxA with a detailed and accurate construction schedule updated on a monthly basis. Coordinate scheduling of commissioning activities with the CxA and include them in the construction schedule.
 - a. Provide schedule for equipment submittals, installation manual submittals, operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a monthly basis throughout the construction period.

- b. Coordinate the regular submission of detailed Subcontractor Schedules to the CxA.
4. Provide CxA with copies of all approved change-orders or other modifications impacting construction when approved.
5. Process and respond to Issues Logs, Field Reports and RFIs from the CxA. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
6. The Contractor has primary responsibility for ensuring commissioning activities are successfully completed by the subcontractors in a timely manner. In order to fulfill that responsibility the contractor shall assist the CxA in coordination and execution of all Construction Phase Commissioning Activities including, but not limited to:
 - a. Planning and participation in construction-phase coordination meetings.
 - b. Planning and participation in commissioning verifications
 - c. Coordination of submittal responses and resubmissions to ensure that resubmissions adequately address design team and CxA comments.
 - d. Ensure accurate completion of Prefunctional Checklists for all Systems to be Commissioned prior to verification site visits by the CxA.
 - e. Certify readiness of Systems to be Commissioned and ensure accurate completion of Functional Performance Test documents prior to performance of Functional Performance Testing
 - f. Facilitate Functional Performance Testing of Systems to be Commissioned and participate in testing at the request of the CxA or responsible Subcontractor.
 - g. Facilitate operation and maintenance planning and verification of training and associated documentation for operations and maintenance transition activities.
 - i. Ensure that the attached training documentation is completed for all training on systems to be commissioned.
 - h. Manage the documentation of commissioning work by the sub-contractors.
 - i. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
 - j. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - k. Track and follow-up on outstanding corrective action items as follows:
 - i. All responses shall be made in the excel document format provided by Cx Associates
 - ii. Issues shall be addressed and responses provided within two weeks after they are identified
 - iii. Where an issue will take longer than two weeks to address, provide a completion date within two weeks of issue identification
 - iv. Resolve all issues within one month of substantial completion.
7. Subcontractors shall assign representatives with expertise and authority to act on behalf of the entity responsible for installation of Systems to be Commissioned who shall participate in and perform commissioning team activities including, but not limited to, the following:

- a. Provide schedules for equipment and system submittals including – submittal information for all Systems to be Commissioned, installation manuals, and operation and maintenance submittals; equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a monthly basis throughout the construction period.
 - b. Participate in construction-phase coordination meetings.
 - c. Process and respond to Issues Logs, Field Reports and RFIs from the CxA.
 - d. Provide information to the CxA for developing construction-phase commissioning plan including, but not limited to: schedule as cited above, equipment submittals, installation manual submittals and operation and maintenance information submittals.
 - e. Complete Prefunctional Checklists for all Systems to be Commissioned in a progressive manner. This entails completing checksheets as the work proceeds – bi-weekly submittal of completed checksheets shall be provided to the CxA throughout MEP fit-up and equipment installation work.
 - f. Participate with the CxA during field verification of contractor completed checklists.
 - g. Schedule manufacturer start-up to include completion of commissioning documentation relative to equipment. Schedule manufacturer representative to be on site during the commissioning verification of start-up documentation and functional testing of equipment set up by Manufacturer representatives including but not limited to equipment specific controls, equipment specific VFDs, emergency generators, etc.
 - h. Maintain updated Project Record Documents for periodic review of the CxA and submit final record documents at project completion.
 - i. Certify readiness of Systems to be Commissioned for performance of Functional Performance Testing
 - j. Complete Functional Performance Tests documents.
 - k. Perform Functional Performance Testing of Systems to be Commissioned under the direction of the CxA.
 - i. Provide technicians who are familiar with the construction and operation of installed systems, are trained in the use of required testing instruments and procedures to participate in testing of installed systems, subsystems, and equipment.
 - l. Designate an Operations and Maintenance Liaison who will have direct responsibility for training planning and execution and for Operations & Maintenance Manual Development.
 - i. Provide operation and maintenance planning, documentation and verification.
 - ii. Provide training sessions for Owner's operation and maintenance personnel.
- F. Commissioning Submittals by Contractor**
1. Commissioning-specific submittals –
 - a. The contractor shall submit completed Prefunctional Checklists and Functional Performance Test Documents.
 - b. The contractor shall submit completed training plans upon approval of submitted equipment
 - c. The contractor shall submit preventive maintenance matrix upon approval of submitted equipment.

- d. The contractor shall submit control device calibration schedule upon approval of the controls submittal.
 - E. Commissioning related requirements for submittals on Systems to be Commissioned: The following information shall be submitted with the product and system product literature and shop drawing submittals for review and approval by the Owner, Architect, Engineering Professionals and the CxA.
 - a. Manufacturer cut sheets and product literature and shop drawings in accordance with the requirements of other Divisions.
 - b. Motor enclosure types and efficiencies designated as NEMA Nominal Efficiency and expressed as a percentage.
 - c. Detailed product data for each piece of equipment including part load capacities (20, 40, 60, 80, 100%), electrical components and requirements, etc. (as appropriate)
 - d. Manufacturer's certified test reports on each piece of equipment.
 - e. Performance curves for each piece of equipment being submitted (20, 40, 60, 80, 100% as appropriate).
 - f. Controls submittals shall include
 - i. Logic flow diagrams for control systems sequences of operation.
 - ii. Diagrams indicating location of all sensors, actuators, safeties and other control devices for all Systems to be Commissioned
 - iii. Detailed Sequences of Operation for all Systems to be Commissioned.
 - iv. Control diagram graphic panels for use with DDC PC monitor, in color.
 - v. Abbreviations and Symbols List
 - vi. All initial setpoints, reset schedules, time delays, etc. using numerical values.
 - vii. Calibration certificates for all required test instruments demonstrating compliance with Part 2 of this section and any additional requirements of Divisions 22, 23 and 26.
 - g. Submit Final Approved Shop Drawings for each piece of equipment to be Commissioned including all "as noted" comments in the final submittal.
 - h. TAB plan including equipment to be used as well as methods and strategies to accomplish TAB where system diversity is present.
 2. The CxA will provide a single review of the submittals. Failure to incorporate agreed upon CxA review comments in subsequent submittals will result in a charge back to the contractor for additional submittal review time.
 3. Progress submittals of completed prefunctional checksheets
 - a. Contractor shall be responsible for obtaining a periodic submittal of project prefunctional checksheets from the responsible subcontractors and providing via fax or hard copy, copies of the completed documentation to the CxA.
 - b. Submittals shall be provided bi-weekly once fit-up and equipment installation for the affected subcontracts commences and the checksheets have been provided by the CxA.
 - c. The contractor shall submit a schedule for checksheet completion, submittal and verification to assist the team in ensuring that the commissioning process is incorporated as construction progresses.
 4. Manufacturer Start-up Information
 - a. Manufacturer's detailed installation and start-up requirements including equipment checklists (manufacturer's installation, startup, etc.) for each

- piece of equipment shall be submitted to the CxA within two weeks of when equipment arrives on site.
- b. Submit manufacturer start-up information prior to starting equipment.
5. Detailed Project Training Plans
 - a. Detailed training agenda
 - b. Qualifications of the trainer(s)
 - c. Date training was held a list of attendees
 6. Operation and Maintenance Manual (Systems Manual): During the design development phase, the scope and format for the project systems manual will be outlined and shall include all the information necessary to operate, maintain, and recommission all energy-consuming systems within the building. Required information for the systems manual will be collected during construction and after completion of the project.
 - a. Submit O&M Manual for each division in plain binders clearly identifying the Client and Project Name and the specific contents of each binder.
 - i. Provide a master index in each binder clearly indicating where information is located.
 - ii. Binders shall be organized by specification section. Provide sub-tabs for information within each section and to identify the location of preventive maintenance requirements and spare parts lists for each piece of equipment.
 - iii. Each piece of equipment shall be clearly identified on the tab label.
 - iv. Operations and Maintenance Manuals shall be fully customized to the project and shall include only product information which is specific and relevant to the project.
 - b. All submittal information indicated in part A of this section above shall be included in the operations and maintenance manual in addition to the information required below.
 - Manufacturer's break-in instructions.
 - Manufacturer's suggested service requirements.
 - Spare parts list edited for specific equipment used on the project.
 - Copy of all equipment specifications.
 - Matrix of preventative maintenance instructions with timeframe/frequency for each task.
 - Troubleshooting guide.
 - Controls calibration checklist.
 7. Provide a binder containing all warranties for each division. Equipment Warranties, contractor, manufacturer and owners obligations to maintain the warranty shall be specifically stated. Binders shall be organized by specification section and equipment name.
 8. Coordination and Record Drawings.

G. Quality Assurance

1. Operations and Maintenance Training Instructor Qualifications: Equipment training shall be provided by factory-authorized technical representatives, experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment. Training sessions shall not include any sales or promotional information.
2. Calibration of Test Equipment: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or

dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated by NIST traceable standards within six months prior to use.

H. Systems to be Commissioned

1. The following systems will be commissioned in this project.
 - a. HVAC
 - i. VAV Air Handling Units
 - a) All associated ductwork and piping
 - b) Witness Factory testing
 - ii. Air cooled chiller and associated variable speed chilled water pumps
 - a) All associated piping
 - iii. VAV boxes including both supply and return.
 - iv. Radiant panels and perimeter radiation zones
 - v. Steam to hot water converters
 - vi. Fan Coil Units or similar terminal device for bridge connector, elevator machine rooms, vestibules, IT closets, etc.
 - vii. Miscellaneous fans including toilet exhaust, stairwell pressurization, etc.
 - viii. All HVAC controls
 - ix. All VFDs
 - b. Plumbing
 - i. Domestic hot water heaters
 - ii. Domestic hot water recirculation pumps
 - iii. Review DHW recirculation installation.
 - c. Electrical
 - i. Lighting and daylighting controls only. Fixture hardware verification is not included.
 - ii. Emergency and Normal power panels (no sampling)
 - iii. Emergency and Normal power receptacles and circuit labeling (random sample throughout building).
 - iv. Procedure Rooms – All normal and emergency power panelboards, isolation transformers, receptacles and circuit labeling (no sampling).
 - v. Visual verification of grounding systems
 - vi. Submittal review of short circuit coordination study.
 - vii. Elevator response to emergency power switchover.
 - d. Fire Alarm
 - i. Interface with HVAC systems only. Verification of devices, functional testing not included.
 - e. Security
 - i. Verification of hardware types and locations.
 - ii. Testing of door access systems and verification of security camera proper operation.

1.2 PRODUCTS

A. Test Equipment

1. All testing equipment required to perform startup, checklist verification and functional performance testing shall be provided by the contractor responsible for the equipment being tested.
2. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified in this Section.

3. All testing equipment calibration shall be:
 - a. NIST traceable standards
 - b. Maintained in good repair and operating condition throughout the duration of use on this project
 - c. Recalibrated/repaired if dropped or damaged in any way since last calibration
4. Test instrumentation shall meet the following standards:
 - a. Immersion temperature measuring instruments, liquids:
 - i. Range, 0 F to 220 F
 - b) Minimum accuracy, +/- .5 degree F
 - c) Resolution, .1 degree F
 - b. Air temperature measuring instruments:
 - i. Range, 0 F to 220 F
 - a) Minimum accuracy, +/- .5 degree F
 - b) Resolution, .1 degree F
 - c. Air humidity measuring instruments:
 - d. Range, 0 % RH to 80 % RH
 - i. Minimum accuracy, +/- 2 % RH
 - ii. Resolution, .1 % RH
 - e. Range, 80 % RH to 97 % RH
 - i. Minimum accuracy, +/- 3 % RH
 - ii. Resolution, .1 % RH
 - f. Carbon Dioxide (CO₂) measuring instruments:
 - i. Range, 0 ppm to 2,000 ppm
 - a) Minimum accuracy, +/- 50 ppm
 - b) Resolution, 1.0 ppm
 - g. Carbon Monoxide (CO) measuring instruments:
 - i. Range, 0 ppm to 500 ppm
 - a) Minimum accuracy, +/- 2 ppm
 - b) Resolution, .1 ppm
 - h. Hydronic pressure measuring instruments:
 - i. Range, 0 PSI to 150 PSI
 - a) Minimum accuracy, +/- .5 PSI
 - b) Resolution, .1 PSI
 - i. Air differential pressure measuring instruments:
 - i. Range, 0 "w.c. to 10" w.c.
 - a) Minimum accuracy, +/- .001 " w.c.
 - b) Resolution, .001 " w.c.
 - j. Air velocity measuring instruments:
 - i. Range, 25 fpm to 2400 fpm
 - a) Minimum accuracy, +/- 15 fpm
 - b) Resolution, 1.1 fpm
 - ii. Range, 2400 fpm to 5000 fpm
 - a) Minimum accuracy, +/- 30 fpm
 - b) Resolution, 1.0 fpm
 - k. For instruments not covered above, the following minimum requirements apply:
 - i. Test instruments shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the previous six months to NIST traceable standards.
5. Test Ports:

- a. Pressure / temperature test plugs to allow the use of insertion-type, hand held gauges and meters:
 - i. Housing: Brass
 - ii. Core Material: EPDM (Nordel)
 - iii. Provide cap retainer strap.
 - iv. Size: 1/4" NPT
 - v. Length: All pipes, insulated or not: maximum 1-1/2" overall.
- b. Acceptable Manufacturers:
 - i. Texas Fairfax Company
 - ii. Peterson Equipment Company
 - iii. Alternate product with prior approval.

1.3 EXECUTION

A. Issues Log and Field Reports

1. CxA maintains an issues log that describes design, installation, and performance issues that are at variance with the OPR, BoD, and Contract Documents.
2. The CxA will document any deficiencies observed during construction, checkout and/or testing in a Field Report. Each Corrective Action will be summarized in an Issues Log. Contractors remedy and document the correction to the CxA. The CxA will verify corrections depending on their scope and scale.
3. The CxA will identify any design related issues in RFIs which will be submitted to the Contractor for processing and tracking.

B. Prefunctional Checklists

1. General. Each piece of equipment receives full prefunctional check-out by the responsible contractor. No sampling strategies are used. The prefunctional check-out protocol for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
2. Prefunctional Checklists: The CxA provides Prefunctional Checklists for each System to be Commissioned. Prefunctional Checklists will be completed by the installing Subcontractor and verified by the Contractor and CxA in the company of the installing contractor. Space will be provided for sign-off of installing Subcontractor, Contractor and CxA. Each checklist will include, but not be limited to, the following:
 - a. Name and identification information of each item being checked.
 - b. Verification of each item including verification of all required data and construction practices as listed in the Prefunctional Checklists.
 - c. Notation of any equipment or installation that deviates from approved submittals or the Construction Documents.
 - d. Name(s) of personnel involved with verification and dates on which verification activities and Prefunctional Checklists were completed.
3. Checklists are provided for specific pieces of equipment and may require check-out and verification by multiple sub-contractors. (For instance the electrical contractor is required to complete portions of the checklists for all powered mechanical equipment.) Affected trades will be indicated on the cover sheet. Each subcontractor shall be responsible for the checkout and verification of their work. The Contractor shall ensure each required subcontractor has completed their work.

- a. Only individuals that have direct knowledge and witnessed that a line item task on the prefunctional checklist was actually performed shall initial or check that item off.
4. Contractor shall provide a full start-up plan for each system to be commissioned including all subsystems, equipment and components which shall at a minimum include the following documentation:
 - a. Manufacturer’s standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
 - b. Manufacturer’s normally used field checkout sheets.
 - c. The subcontractors shall execute startup and provide the CxA with a signed and dated copy of the completed start-up and prefunctional checklists.
5. Contractor shall verify 100% of all devices and equipment on the Prefunctional Checklists. Sampling is not acceptable.
6. Completion of prefunctional checksheets shall occur as the installation progresses. Commissioning verification of checksheets shall be scheduled based on bi-weekly submission of completed or partially completed prefunctional checksheets by the subcontractors.
7. Sensor Calibration
 - a. Calibration of all sensors shall be included as part of the prefunctional checklists.
 - b. Sensor Required Tolerances listed below shall be the criteria for acceptance. The following are default criteria, subject to revision based on accuracy of final approved and installed devices.

<u>Sensor</u>	<u>Required Tolerance (+/-)</u>	<u>Sensor</u>	<u>Required Tolerance (+/-)</u>
Cooling coil, chilled and condenser water temps	0.3F	Flow rates, water	4% of design
AHU wet bulb or dew point	1.0F	Lighting Illumination	3% of design
Hot water coil and boiler water temp	1.0F	Combustion flue temps	5.0F
Outside air, space air, coil air temps	0.5F	Oxygen or CO ₂ monitor	0.1 % pts
Watt-hour, voltage & amperage	1% of design	CO monitor	0.01 % pts
Pressures, air, water and gas	3% of design	Natural gas and oil flow rate	1% of design
Flow rates, air	10% of design	Steam flow rate	3% of design
		Barometric pressure	0.1 in. of Hg

8. The CxA will verify prefunctional checklists for each piece of primary equipment in the company of the responsible subcontractors.
9. For lower-level components of equipment, (e.g., VAV boxes, sensors, controllers), the CxA shall observe a sampling of the prefunctional check-out and start-up procedures.

C. Functional Performance Testing

1. Prerequisites for Testing:
 - a. Systems to be Commissioned have been completed, calibrated, and started; are operating according to the OPR, BoD, and Contract Documents;
 - b. Instrumentation and controls associated with the Systems to be Commissioned have been completed and calibrated; are operating according to the OPR, BoD, and Contract Documents; and that pretest set points have been recorded.
 - c. TAB procedures have been completed, and that TAB reports have been submitted, discrepancies corrected, and corrective work approved.
 - d. Prefunctional Checklists for systems, subsystems, and equipment are completed and verified.
 - e. Perform Pretest procedures including:
 - i. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shut down, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
 - ii. Verify each operating cycle after it has been running for a specified period and is operating in a steady-state condition.
 - iii. Inspect and verify the position of each device and interlock identified on checklists. Sign off each item as acceptable, or failed. Repeat this test for each operating cycle that applies to system being tested.
 - iv. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
 - v. Annotate checklist or data sheet when a deficiency is observed.
 - f. Verify equipment interface with monitoring and control system and TAB criteria; include the following:
 - i. Supply and return flow rates for variable flow and constant volume systems in each operational mode, including maximum and minimum flow/capacity.
 - ii. Operation of terminal units in both heating and cooling cycles.
 - iii. Minimum outdoor-air intake in each operational mode and at minimum and maximum airflows.
 - iv. Building pressurization.
 - v. Total exhaust airflow and total outdoor-air intake.
 - vi. Operation of indoor-air-quality monitoring systems.
 - g. Verify proper responses of monitoring and control system controllers and sensors to include the following:
 - i. For each controller or sensor, record the indicated monitoring and control system reading and the test instrument reading. If initial test indicates that the test reading is outside of the control range of the installed device, check calibration of the installed device and adjust as required. Retest malfunctioning devices and record results on checklist or data sheet.
 - ii. Report deficiencies and prepare an issues log entry.
 - h. Testing Instrumentation: Install measuring instruments and logging devices to record test data for the required test period. Instrumentation shall monitor and record full range of operating conditions and shall allow for calculation of total capacity of system for each mode of operation. For individual room cooling tests, provide temporary heaters

- to impose a cooling load indicated in BoD. Operational modes may include the following:
- i. Occupied and unoccupied.
 - ii. Full load and minimum load
 - iii. Maximum flow and minimum flow.
 - iv. Warm up and cool down.
 - v. Economizer cycle.
 - vi. Emergency power supply.
 - vii. Life-safety alarm modes.
 - viii. Temporary upset of system operation.
 - ix. Partial occupancy conditions.
 - x. Special cycles.
2. Objectives and Scope
- a. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and function of the systems.
 - b. In general, each System to be Commissioned should be operated through all modes of operation where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.
3. Functional Performance Test Documents:
- a. The CxA will develop Functional Performance Test Documents for each System to be Commissioned including
 - i. Name and identification code of each item being checked.
 - ii. Test number.
 - iii. Time and date of test.
 - iv. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 - v. Dated signatures of the person performing test and of the witness.
 - vi. Individuals present for test.
 - vii. Deficiencies.
 - viii. Issue number, if any, generated as the result of test.
 - ix. Calibration of sensors and sensor function.
 - x. Testing conditions under which test was conducted, including (as applicable) ambient conditions, set points, override conditions, and status and operating conditions that impact the results of test.
 - xi. Control sequences for mechanical and electrical systems.
 - xii. Responses to control signals at specified conditions.
 - xiii. Sequence of response(s) to control signals at specified conditions.
 - xiv. Electrical demand or power input at specified conditions.
 - xv. Power quality and related measurements.

- xvi. Expected performance of systems, subsystems, and equipment at each step of test. Narrative description of observed performance of systems, subsystems, and equipment. Notation to indicate whether the observed performance at each step meets the expected results.
 - xvii. Interaction of auxiliary equipment including interfaces and interlocks.
 - xviii. Separate entries will be provided for each item to be tested.
 - xix. Separate tests will be provided for each mode of operation.
 - b. The CxA will witness and document the results of functional performance tests using the specific procedural forms developed for that purpose.
 - c. Reports will include measured data, data sheets, and a comprehensive summary describing the operation of systems at the time of testing.
 - d. Data sheets for each controller verifying proper operation of the control system, the system it serves, the service it provides, and its location will be provided.
4. Test Methods
- a. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's graphic trend log capabilities.
 - b. Simulated Conditions.
 - i. Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
 - c. Overwritten Values
 - i. Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible.
 - d. Simulated Signals.
 - i. Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
 - e. Altering Setpoints.
 - i. Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable.
 - f. Indirect Indicators.
 - i. Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses.
 - g. Perform tests using design conditions whenever possible and where required.
 - h. Setup.
 - i. Each function and test shall be performed under conditions that simulate actual conditions to the closest practical approximation.

- ii. The Contractor executing the test shall provide all necessary materials, system modifications, etc. to produce the flows, pressures, temperatures, etc. necessary to execute the test under specified conditions.
 - iii. At completion of the test, the Contractor shall return all affected building equipment and systems to their pre-test condition.
 - i. Sampling.
 - i. Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested by the CxA using a sampling strategy.
 - ii. No sampling is allowed during execution of prefunctional check-out or in contractor provided testing.
 - iii. The following sampling technique will be applied: 25% Sampling—10% Failure Rule.
 - a) Randomly test at least 25% of each group of identical equipment. In no case test less than three units in each group. This 25%, or three, constitute the “first sample.”
 - b) If 10% of the units in the first sample fail the functional performance tests, test another 25% of the group (the second sample).
 - c) If 10% of the units in the second sample fail, test all remaining units in the whole group.
 - d) If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the responsible subcontractor to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units.
- 5. Coordination and Scheduling
 - a. The subcontractors shall provide sufficient notice to the CxA regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The CxA shall direct, witness and document the functional testing of all equipment and systems.
 - b. Subcontractors are responsible for execution of all tests.
 - c. Functional testing is conducted after prefunctional checklists and startups have been satisfactorily completed. The control system is sufficiently reviewed and approved by the CxA before it is used for TAB or to verify performance of other components or systems.
 - d. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems.
 - e. Testing proceeds from components to subsystems to systems.
 - f. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.
- 6. Seasonal Testing & Post Occupancy Verification
 - a. Subcontractors shall perform seasonal test and opposite seasonal testing for major systems (heating/cooling) that cannot be tested under actual seasonal conditions during construction. Provide opposite season trend logs.
 - b. The controls subcontractor shall participate in opposite season testing and also at least one post occupancy site visit with the CxA.

7. Problem Solving
 - a. The CxA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems rests with the Contractor, Subcontractors, Architect and Engineering Professionals.
 8. Trend Logs
 - a. Upon completion of successful functional performance testing, contractor shall submit graphic trend logs to CxA.
 - b. Submit color graphic trend log for each piece of controlled equipment for each controlled parameter.
 - c. Trend logs shall demonstrate successful performance for a seven day period, unless the controlled process requires a longer timeline.
 - d. Trend log color printouts shall be submitted demonstrating successful seasonal performance.
 - e. Provide opposite season trend graphs.
 - f. Trend logs shall be color graphic, with legends, submitted to CxA in color printout form or electronically in .pdf format.
 - g. CxA will recommend acceptance of a specific piece of equipment once the submitted trends are reviewed and approved by CxA.
 9. Test and Verification Field Reports: CxA will record test data, observations, and measurements on test documents. Photographs, forms, and other means appropriate for the application shall be included with test documentation. CxA will compile test and verification reports and test and verification certificates and include them in systems manual and commissioning report.
- D. Non-Conformance and Approval of Tests
1. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. The CxA is responsible for verification of system installation and function. The CxA will not overlook deficient work or loosen acceptance criteria to satisfy scheduling or cost issues.
 2. Commissioning Issues
 - a. Cx Associates will document all commissioning issues in a commissioning issues log. The log will be provided in excel format to the Contractor whenever it is revised.
 - b. The responsible contractor shall remedy the issue, update the log in excel format and return the updated log to Cx Associates within two weeks of when the issue is identified.
 - c. All open issues shall be closed within one month of substantial completion.
 - d. Time & materials required to verify completion of any open commissioning issues one month after the issue was identified and/or one month after substantial completion shall be back charged to the contractor through the Owner.
 - e. LEED requires that all commissioning issues be closed prior to the submission of the commissioning documentation.
 3. Non-Conformance.
 - a. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.
 - b. Should a deficiency be identified during verification or testing, the CxA will discuss the issue with the responsible subcontractor.
 - i. When there is no dispute on the deficiency and the subcontractor accepts responsibility to correct it:

- a) The CxA documents the deficiency and the subcontractor's response and intentions and they go on to another test or sequence.
 - b) After the day's work, the CxA submits the non-compliance reports to the Contractor.
 - ii. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
 - a) The deficiency shall be documented with the subcontractor's response and a copy given to the Contractor.
 - b) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the Owner.
 - iii. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, provides a statement of correction and provides it to the CxA. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.
- c. If it is determined that the system is constructed according to the Contract Documents, Owner will decide whether modifications required to bring the performance of the system to the OPR and BoD documents shall be implemented or if tests will be accepted as submitted. If corrective Work is performed, Owner will decide if tests shall be repeated and a revised report submitted.
- d. Cost of Retesting.
 - i. The cost for the subcontractor to re-perform a prefunctional check-out or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner.
 - ii. The time for the CxA to direct any re-verification or retesting required due to failures or lack of completion at the initial verification and/or testing, will be back charged to the Contractor through the Owner at 1.5 times the rate for Cx services.
- e. Failure Due to Manufacturer Defect.
 - i. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CxA. In such case, the subcontractor shall provide the Owner with the following:
 - a) Within one week of notification from the Contractor, the subcontractor or manufacturer's representative shall examine all other identical units making a record of the findings.
 - b) The findings shall be provided to the CxA within two weeks of the original notice.
 - c) Within two weeks of the original notification, the Contractor, subcontractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals.

- 1) The proposed solutions shall not significantly exceed the specification requirements of the original installation.
 - d) The Owner will determine whether a replacement of all identical units or a repair is acceptable.
 - e) Two examples of the proposed solution will be installed by the subcontractor and the subcontractor will be allowed to test the installations for up to one week, upon which the Owner will decide whether to accept the solution.
 - f) Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.
 - f. Approval.
 - i. The CxA notes each satisfactorily observed checklist item or demonstrated test function on the test form. The CxA recommends acceptance of each test to the Owner using a standard form.
 4. Deferred Testing:
 - a. If tests cannot be completed because of a deficiency outside the scope of the subcontractor responsible for installation of the System to be Commissioned, the deficiency shall be documented and reported to Owner. Deficiencies shall be resolved and corrected by appropriate parties and test rescheduled.
 - b. Where seasonal testing is required, appropriate initial performance tests shall be completed, documented, and additional tests scheduled.
- E. Operation and Maintenance Training Requirements
 1. Training shall be delivered in a coordinated manner to provide building Operations and Maintenance Personnel with a comprehensive understanding of the building, systems, equipment and controls systems.
 - a. Each subcontractor shall designate a training liaison who is responsible for developing, scheduling, providing all required training submittals and documentation, and ensuring the quality of training provided under contract by each trade.
 2. Training Plans shall be prepared by the contractor and submitted to the CxA and the Owner for review and comment prior to finalizing training plans for each system to be commissioned. Training Plans shall be submitted within one month of submittal approval for major equipment and controls. Training Plans shall include:
 - a. Trainer qualifications and certifications.
 - b. Training content shall include field orientation during installation, classroom instruction and field training after the completion of installation and cover the following elements:
 - i. Equipment included in training
 - ii. Intended audience
 - iii. Location of training
 - iv. Detailed Agenda including, but not limited to:
 - a) Objectives
 - b) Subjects covered (description, duration of discussion, special methods, etc.)

- c) Description of training rigor
 - d) Duration of training on each subject
 - v. Hand-outs
 - vi. Instructor for each subject
 - vii. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
 - viii. Instructor resumes
- c. For primary equipment, the Controls subcontractor shall provide an overview of the system, and discussion of the associated control and other interfaces.
- d. Contractor shall provide edited and clearly labeled videotapes of training sessions for future training use by the Owner.
3. Complete O&M manuals and as-built documents shall be submitted for review prior to training and used to support the training sessions.
4. The CxA will verify and approve the content and adequacy of the training of Owner personnel for Systems to be Commissioned.
5. In addition to these general requirements, additional training requirements for Owner personnel are specified in other Divisions.
6. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

F. Current Facility Requirements and O&M Plan

1. Prepare and maintain a current facility requirements (CFR) and operations and maintenance (O&M) plan that contains the information necessary to operate the building efficiently. This information is covered in the OPR, BOD, and functional test scripts, but more information may be taken from specific submittals or equipment operations and maintenance manuals. The plan must include the following:
 - Sequences of operation for the building
 - Building occupancy schedule
 - Equipment run-time schedules
 - Setpoints for all HVAC equipment
 - Lighting levels throughout the building
 - Minimum outside air requirements
 - Changes in schedules or setpoints for different seasons, days of the week, and times of day
 - Systems narrative describing the mechanical and electrical systems and equipment
 - Preventive maintenance plan for building equipment described in the systems narrative
 - Cx program that includes periodic Cx requirements, ongoing Cx tasks, and continuous tasks for critical facilities

G. Operations and Maintenance Manual (Systems Manual)

1. Operation and Maintenance Manuals shall include the following information which is necessary to operate, maintain, and recommission all energy-consuming systems within the building:
 - a. The basic scope and format of a systems manual are outlined in ASHRAE Guideline 0–2005, Annex O; the manual usually includes the following:
 - Executive summary
 - Owner's project requirements

- Basis of design
- System single-line diagrams
- Construction record documents and specifications
- Approved submittals
- As-built drawings
- As-built sequence of operation
- Original setpoints for all systems commissioned
- Recommended schedule for recommissioning
- Recommended schedule for sensor recalibration
- Equipment operations and maintenance manuals
- Equipment preventive maintenance schedules
- Confirmation of completed training for the owner and occupants
- Ongoing system optimization procedures
- Final commissioning report

H. Test Ports

1. Application: All points.
 - a. The contractor shall provide test ports (Pete's Plugs) for handheld instrument readings near all piping system sensors in the primary system and for all air system devices.

END OF SECTION

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SECTION 01 91 19

Building Enclosure Commissioning

PART 1 - GENERAL

1.1 SUMMARY

- A. Maine Medical Center (Owner) has elected to implement a Building Enclosure Commissioning (BECx) Process, as detailed in this document, as a supplement to the quality control processes for the proposed East Tower building. As the Building Enclosure Commissioning Provider (BECxP) for the project, it is the responsibility of RDH Building Science, Inc. (RDH) to implement the BECx Process and along with the Commissioning Team to ensure that the final product meets the Owner's Project Requirements (OPR).
- B. Statement of Building Enclosure Design Intent (BEDI): The design intent for this building enclosure is to provide a combination of systems for below grade, façade, fenestration and roofing conditions that separately and collectively conforms to the Maine Medical Design Standards, Criteria, and Expectations. The enclosure should meet all serviceability requirements to the specified levels, as specified by the individual Building Enclosure (BE) technical sections in Divisions 03 through 09, to eliminate uncontrolled rainwater; control condensation potential; provide thermal insulation continuity; limit air infiltration/exfiltration, and any other specified serviceability requirements. All enclosure materials should be proven products and assemblies that are technically sound, durable and serviceable over the design life of the enclosure.
- C. Building Enclosure Commissioning (BECx) facilitates a quality oriented process to verify that all building enclosure components are installed and perform collectively according to the BEDI and that the installation is adequately tested and that the specified performance is verified and documented. It serves as a tool to identify deficiencies in the building enclosure during the preconstruction and construction phases to advance the building enclosure components from mock-up installations, through installation of the separate components on the structure, to a fully integrated, weather-tight assembly prior to occupancy, thereby reducing impact on the building end user.
- D. The role of the BECxP will be carried out by Building Enclosure Commissioning Specialists (BECxS) and Building Enclosure Commissioning Technologists (BECxT) who shall work with the Contractor and Contractor's Quality Assurance and Quality Control Plan and personnel to oversee the BECx processes and performance testing. The BECxP will observe tests as deemed appropriate. All required testing, unless otherwise specified in Part 3 or in the individual BE technical sections (03 to 09), will be performed by an independent third-party testing agency retained by the BECxP.
- E. The BECxP will be contracted under the Owner for commissioning services. The Contractor shall coordinate and assist the BECxP to complete the scope of work outlined in this specifications section. The BECxP shall coordinate their work under the auspices of the project Commissioning Authority (CxA), Maine Medical.
- F. Commissioning does not relieve the installing contractors of their own internal, self-testing and/or quality control procedures.

1.2 SCOPE

- A. This Section includes building enclosure commissioning procedures, including below grade systems, exterior facade enclosure, fenestration, and roofing or other construction that separate climate-controlled interior spaces from unconditioned spaces and the exterior environment, as follows:
 - 1. Above grade building enclosure construction, including exterior opaque walls, fenestration, and doors including sheathing, framing, insulation, air barrier, vapor barrier and cladding.
 - 2. Roofing, including roofing system, roofing insulation, hatches, and other roof openings and penetrations.
 - 3. Below grade vapor retarders and associated materials.
 - 4. Continuous building enclosure systems: the collection of building enclosure materials, systems, assemblies and transitions that make up a continuous boundary to manage and control thermal, air, and moisture exchange between interior and exterior within required performance levels.
- B. Materials, Product and Assembly Performance Testing as required by individual sections, and/or as outlined in Part 3 of this specification. All performance values shall be as described within each relevant section of the Project Specification.
- C. Record Documents related to BECx.

1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.
- B. Commissioning Specifications: See Division 01 Section 01 91 13 - General Commissioning Requirements for general requirements for all commissioning including definitions, means and methods for conducting the commissioning process, commissioning team members, Owner's responsibilities, Contractor's responsibilities, and Commissioning Authority's responsibilities.
- C. Individual Building Enclosure Specification Sections: Individual building enclosure technical sections (Divisions 03-13) stipulate requirements for material performance testing criteria, and warranties for the material, product or assembly specified in the Section. Installation, product testing, and assembly testing are stipulated in each section and/or Division 01 Section 01 91 19A - Building Enclosure Commissioning of this section.

1.4 RELATED SECTIONS

- A. See Table 1 in Division 01 Section 019119A Building Enclosure Commissioning Appendix A for a list of related Building Enclosure Specification sections in Divisions 03 through Divisions 13

1.5 WORK INCLUDED

- A. Commissioning requirements common to all Building Enclosure-Related Sections, including but not limited to the following:
 - 1. Validation of proper and thorough installation of Building Enclosure components.

2. Building enclosure component performance verification.
3. Documentation of tests, procedures, and installations.
4. Coordination and requirements for field mock-up, trial installation and Functional Performance Testing events.
5. Preparation and coordination of Building Enclosure Commissioning Report

1.6 DEFINITIONS AND ABBREVIATIONS

- A. Action Item (AI): Any issue that requires a response, completion, corrective or additional work, or any other action related to the construction. Examples include a subcontractor's Request for Information (RFI), a Contractor's Field Directive, a clarification request, or a documented deficiency in the Work. Action Items must be categorized and assigned to the appropriate party for remedial action.
- B. Action List (AL): This is a list that is maintained and updated by the BECxP that includes all Action Items that relate to BECx activities, including a summary description of each AI (including photograph where appropriate), the date that each AI was first documented, the appropriate party responsible for remedial action, the date corrective action was performed, and a brief summary of the remediation.
- C. Building Enclosure Commissioning (BECx): The process of facilitating the quality installation of the building enclosure materials, components, and systems in accordance with the contract documents and satisfy the requirements of the BEDI.
- D. Building Enclosure Commissioning Provider (BECxP): The Party retained by the Owner, RDH Building Science, Inc (RDH) will oversee the BECx process, develop and stipulate many of the BECx requirements, manage the BECx process, and validate that building enclosure systems are designed, installed and tested to meet the Owner's requirements and/or contract documents provided by the Contractor.
- E. Building Enclosure Commissioning Report: The *Building Enclosure Commissioning Report* is the final deliverable from the BECx process, and provides the information needed to understand and maintain the facility's building enclosure. It should be the repository of all updates and corrections as they occur.
- F. Building Enclosure Commissioning Team (BECxT): The group of Parties involved in the BECx process for any given system. This project group is comprised of representatives from:
 1. Owner (Owner) and their consultants.
 2. Architect of Record (AOR) and their consultants including any Engineer of Record (EOR) that comprise the A/E team responsible for building enclosure design
 3. Construction Manager (CM) and their contractors and sub-contractors related to the building enclosure design, fabrication, and construction
 4. Commissioning Authority (CxA)
 5. Building Enclosure Commissioning Provider (BECxP).
- G. Commissioning (Cx): The process of ensuring that all building systems perform interactively according to the design intent, the systems are efficient and cost effective and meet the Owner's Project Requirements.

- H. Commissioning Portal: This is an internet hub for the collaboration on Cx and BECx information. This portal will act as a hub for posting electronic information. The portal will be administered by the Contractor.
- I. Contract Documents: The documents governing the responsibilities and relationships between Parties involved in the design and construction of this project including (but not necessarily limited to):
 - 1. Agreements/Contracts.
 - 2. Construction Document Drawings and Specifications.
 - 3. Addenda.
 - 4. Change Orders.
- J. Construction Documents: Refers generally to the Contract Documents that dictate the details of construction (all but item 1. and 4. above).
- K. Construction Phase: Phase of the project during which the facility is constructed. During this phase, the Contractor and subcontractors complete the installation and field testing requirements.
- L. Contractor: As used herein, 'Contractor' is a specific reference to the design-builder.
- M. Deficiency: A condition in the installation or function of a material, assembly, or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the Design Intent).
- N. Field Testing Authorized Representative: On-site testing of Building Enclosure materials, components and systems conducted by an authorized Manufacturer's Technical Representative and/or independent Testing Agency.
- O. First-In-Place Mockups or Construction: First installation of system or materials to be subject to relevant performance testing specified in this section. First-in-place construction shall include specified materials installed in accordance with design intent and with assumption that the work will be incorporated into the finished work without further modification, provide that field testing demonstrates desired performance.
- P. Manufacturer's Technical Representative: An individual in direct employ of the manufacturer of the applicable material, component, or system who is technically qualified in the judgment of BECxP to perform the applicable work for which the reference is made.
- Q. Party: Entity legally responsible for portion of work.
- R. Point of Contact (POC): General reference to the key individual within each Party.
- S. Project Phases: Phases of the project including the Pre-Construction Phase, The Construction Phase, and The Warranty Phase, including Post-Occupancy Evaluation to be completed at the Owner's discretion by the appropriate members of the BECx Team for this project.
- T. Subcontractor: As used herein, 'Subcontractor' is a general reference to the installing Party and can therefore refer to any of the subcontractor or vendors inferred by its usage.
- U. Substantial Completion: As defined in the Owner-Contractor agreement. This milestone will coincide with the end of the Construction Period and the acceptance of the Property, or portions thereof, by the Owner. This milestone also coincides with the start of the warranty period.

- V. Testing Agency: An independent and qualified testing agency for each of the materials, components, or systems to be tested or evaluated for compliance with the requirements of the contract documents. Qualified testing agency will have demonstrated knowledge and experience with the any testing they are assigned to complete.
- W. Warranty Phase: Beginning on the date of Substantial Completion and continuing through the Warranty Period of each Building Enclosure material, component, and system

1.7 REFERENCED STANDARDS

- A. ASHRAE NIBS Guideline 3-2012, "Exterior Enclosure Technical Requirements for the Commissioning Process"
- B. ASTM E2813, "Standard Practice for Building Enclosure Commissioning"
- C. ASTM E2947, "Standard Guide for Building Enclosure Commissioning"
- D. Reference standards as identified in the individual Building Enclosure technical sections of this specification.

1.8 DOCUMENTATION

- A. The Contractor shall provide a letter, signed by the Contractor and all relevant subcontractors stating that each acknowledges in writing that the Owner regards the new building enclosure to be an important and performance-sensitive single element of the project. In support of this requirement, the Contractor must also acknowledge that they are solely responsible for the quality and coordination all exterior enclosure materials, components and systems such that they result in a fully integrated, weather-tight exterior enclosure that is in compliance with the Contract Documents
- B. The Owner shall provide to the BECxP (and maintain) current contract documents for review and comment at the earliest possible time prior to the onset of construction. BECxP shall perform a constructability review and provide comments related to the durability, performance and BE conformance with the Owner Project Requirements for consideration by the Owner, A/E and Contractor.
- C. The Contractor shall provide to the BECxP the following per the procedures specified herein and in other Building Enclosure Technical Sections of the specification (Divisions 03-13) and Division 01 Section 01 33 00 Submittal Procedures:
 - 1. Shop Drawings and Product Data: Provide shop drawings and submittal data for materials, products, systems and equipment that will be part of the BECx process.
 - a. The Contractor shall notify the BECxP when Shop Drawings and Product Data have been posted to Project Web-site, concurrent with notification to the A/E. BECxP shall review and provide comments to the Owner and A/E, who will then review and incorporate the BECxP comments at their discretion and return to the Contractor. The Contractor shall then notify BECxP when the reviewed submittal with A/E submittal review stamp has been posted.
 - b. Any action taken by the A/E or Contractor based in whole or in part on the comments and recommendations provided by the BECxP as part of its submittal review shall be the sole responsibility of the A/E or Contractor.
 - 2. Factory/Laboratory Test Reports: The Contractor shall provide any factory or laboratory testing documentation, material compatibility testing, or certified test reports required by the specifications. These shall be provided prior to acceptance and installation of the specific item.

3. Schedule Updates: The Contractor shall issue periodic updates to the construction schedule every two weeks or less as appropriate. Contractor shall use schedule to notify BECx team of scheduled tests and milestone installation events.
 4. Action Item Response: Respond to Action Items to which BECx team members assign the Contractor responsibility within 10 business days of issue.
 5. Testing Agency Reports. Provide all documentation of work of independent testing agencies required by the specification. These shall be provided prior to acceptance by A/E and installation.
- D. Record Drawings: The Contractor shall maintain at the site an updated set of record or 'As-Built' documents reflecting actual installed conditions and all approved changes and modifications to the contract documents. The Contractor shall provide access to the BECxP to review the As-Built and Record Drawings. The Record Drawings shall be maintained concurrently with construction.

1.9 COORDINATION MANAGEMENT PROTOCOLS

- A. Unless otherwise defined and agreed to by the parties to the contract documents for this project, coordination responsibilities and management protocols relative to BECx are defined below, subject to further refinement during the Construction Phase BECx pre-construction meeting.
1. Submittals and Shop Drawings: The BECxP shall review submittals and shop drawings in accordance with documentation and procedural requirements outlined in this section.
 2. Deficiencies Identified by the BECxP: When the BECxP identifies a deficiency, the Contractor shall make a good faith assessment of responsible parties. Those parties shall be notified of the perceived deficiency. This communication is for information only and is not a direction to resolve the deficiency. Contractor may accept responsibility and resolve the deficiency voluntarily. If Contractor contests either the deficiency or responsibility for that deficiency, Contractor shall respond to that affect in writing to the project team for review.
 3. Requests for Meetings (beyond regularly scheduled meetings): In general request by the Contractor for additional meetings with the BECxP shall be routed through the Owner who will then confirm the necessity for the meeting. Note that every attempt should be made to deal with BECx issues at regularly scheduled BECx Meetings.
 4. Scheduling Coordination: Contractor shall review the BE technical specifications, identify required BECx items (including field test requirements, specified test standards, mock-ups, product submissions, milestone installations, and similar) and provide a schedule to the BECxP with anticipated dates for each. It is the responsibility of the Contractor to provide adequate time from submission of each BECx requirement to response from the BECxP, and resolution of any identified deficiencies without unnecessary deleterious impact on the project schedule.
 5. Notification of Completion Milestones: Contractor shall notify Owner and BECxP at least two weeks prior to an anticipated BECx activity or BECx milestone (such as installation of a new facade component). Contractor and BECxP shall then coordinate the scheduling of the activity between all required parties as applicable. Notification shall be via e-mail.
 6. Action List: BECxP maintains a categorized Action List which tracks the BECx related action items. All content of the Action List will be available to all parties who have credentials on the portal. Any party with credentials may post an Action Item. Any party

that is copied on an email resulting from an Action Item posting may respond to it and contribute to the dialogue.

1.10 CONTRACTOR'S RESPONSIBILITIES

- A. As defined in this Section and in the individual technical Building Enclosure Technical Sections (Divisions 03-13), identified in Section 01 91 19A Building Enclosure Commissioning Appendix A, including but not limited to the following:
1. Review and distribute submittals. Review and comment on BECxP comments on the submittals.
 2. Integrate commissioning activities into the master construction schedule with input from the BECxP.
 3. Attend the routine BECx meetings.
 4. Coordinate and Chair pre-construction/pre-installation and construction-phase coordination meetings.
 5. Provide summary and schedule of field quality control tests and inspections required by the Contract Documents to BECxP.
 6. Participate in BECx Kickoff meeting.
 7. Participate in pre-construction mock-up and field testing coordination meetings.
 8. Coordinate with the BECxP for pre-construction mock-ups and construction testing and submit laboratory and field quality control testing, field checklists and inspection reports on building enclosure construction to the BECxP. Perform out of sequence work as require facilitating field tests.
 9. Perform internal quality control procedures and document procedures prior to notifying the BECxP that systems are ready for testing.
 10. Submit maintenance data for products, assemblies, and components to the BECxP.
 11. Provide test data, inspection reports, and certificates to BECxP.
 12. Review and respond to AI in a timely manner (typically within ten (10) business days).
 13. Provide input for final BECx documentation.
 14. Participate in warranty inspection.
 15. Assist and coordinate with all field performance testing efforts as outlined in Section 01 91 19A Building Enclosure Commissioning Appendix A, whether the Contractor or other party is identified as responsible for the testing.

1.11 A/E RESPONSIBILITIES

- A. Attend the Preconstruction BECx Conference and routine BECx meetings.
- B. Attend preconstruction and construction-phase coordination meetings.
- C. Participate in Pre-construction, Mock-Up, and Field testing coordination meetings.

- D. Provide recommendations for resolving items for which the BECxP and Contractor may disagree.
- E. Provide input for final commissioning documentation.
- F. Review and comment on BECxP review comments, reports and/or issues logs

1.12 OWNER RESPONSIBILITIES

- A. Review and comment on BECxP review comments, reports and/or issues logs
- B. Attend the Preconstruction BECx Conference and routine BECx meetings.

1.13 BECxP RESPONSIBILITIES

- A. Review submittals.
- B. Attend pre-construction meetings.
- C. Conduct BECx Kickoff meeting.
- D. Participate in Project-Specific mock-ups and outline the commissioning process for both field and laboratory performance test procedures and testing criteria.
- E. Conduct observations at the fenestration and cladding system fabrication and assembly shops to observe and document that required work and quality processes are being carried out by the relevant contractors in any pre-assembly or off-site construction. The BECxP will document noncomplying work items, report them to the Project Team, and provide a summary report of observations. The summary report will include a list of noncomplying work items to serve as an ongoing record that is updated after each site visit.
- F. BECxP will conduct site visits during construction to review the progress of the enclosure work, evaluate its compliance with the design documents and industry standards, witness building enclosure field testing, and milestone installations. The BECxP will document noncomplying work items, report them to the Project Team, and provide a summary report of observations. The summary report will include a list of noncomplying work items to serve as an ongoing record that is updated after each site visit
- G. Conduct routine BECx meetings to review progress on AI list and resolve issues affecting the building enclosure.
- H. Compile test data, inspection reports, and certificates for inclusion in the BECx Report.
- I. Assist contractor with coordinating independent third-part testing agency for mock-up and field performance testing of building enclosure, or conduct testing as outlined in Section 01 91 19A Building Enclosure Commissioning Appendix A.
- J. Participate in 10-month warranty inspection.

1.14 BUILDING ENCLOSURE PERFORMANCE TESTING

- A. Quality Assurance and Control: Specific BECx quality-assurance and quality-control requirements for individual Building Enclosure and materials, methods, and assemblies are specified in the BE Technical Sections relating to those activities. Specified commissioning tests, inspections, and related actions are specified in Section 01 91 19A Building Enclosure

Commissioning Appendix A, do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.

- B. The objective of Building Enclosure Performance Testing is to demonstrate that each Building Enclosure system, and system-to-system interfaces meet or exceed the performance requirements of the Contract Documents.
- C. CM and their contractors shall provide assistance, coordination and scheduling of field performance testing in accordance with the following requirements:
 - 1. Complete testing prior to installation of interior insulation and gypsum board.
 - 2. Complete testing after installation of adjacent air barrier with cladding anchorage components and/or cladding components.
 - 3. CM and their contractors to provide powered scaffold, aerial lifts, hose, water supply, communication system and manpower to perform tests.
 - 4. CM and their contractors to provide up to ten 24"x24" roofing test cuts in the roofing systems as directed by the BECxP to verify roofing construction and moisture related conditions in accordance with BECx field testing requirements. Contractor to provide permanent repairs to test cut conditions.
 - 5. Contractor will work with the Test Agency and BECxP to determine necessity for additional test methods and for field chamber tests based upon evaluation of initial test results. The BECxP will interpret marginal results and adjust the test procedures as appropriate.
 - 6. Contractor shall perform out-of-sequence work as required facilitating system tests and comply with BECx field testing schedule and milestones.
- D. Initial Building Enclosure Performance Testing should be conducted as soon as possible during the construction phase so that adjustments to material selection, fabrication methods, or installation practices may be identified and implemented for the remaining construction to minimize negative impacts to overall project cost, schedule, and quality.

1.15 DEFICIENCIES IDENTIFIED DURING BE FUNCTIONAL PERFORMANCE TESTING

- A. Non-Conformance. Non-conformance deficiencies identified during Periodic Site Visits or Building Enclosure Performance Testing shall be resolved as follows:
 - 1. The BECxP will record the results of the review / field performance test in the BECx Software project database and post reports to Project Web-site. All deficiencies or non-conformance issues shall be noted as Action Items and reported to the Contractor.
 - 2. Corrections of identified minor deficiencies may be made during the review / tests at the discretion of the BECxP. In such cases the deficiency and associated resolution will be documented in the database.
 - 3. Every effort will be made by the BECxP to expedite the review / testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
 - 4. As reviews / tests progress and a deficiency is identified, the BECxP will discuss the issue with the Contractor for follow-up and resolution.
 - a. When there is no dispute with respect to the deficiency and the Contractor accepts responsibility to correct it:

- 1) The BECxP shall document the deficiency and the Contractor's response. A copy/email of the deficiency shall be generated and provided to the Contractor. The Contractor corrects the deficiency, completes the Action Item response certifying that the issue is resolved and /or the product, material or assembly is ready to be retested and notifies the Project Team.
- b. If there is a dispute about a deficiency:
 - 1) The deficiency shall be documented as an Action Item with the Contractor's response and the Contractor will be notified. The Contractor will track this issue under the construction contract dispute resolution provisions.
 - 2) Final interpretive authority is with the Owner. Final acceptance authority is with the Owner or A/E.
 - 3) The BECxP documents the resolution to the Action Item.
 - 4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, and responds to the Action Item indicating completion. The Contractor reschedules the review / test and the review / test is repeated until satisfactory performance is achieved. The Action Item is then considered as closed.
- B. Failure: As defined in each Building Enclosure Technical Sections (Divisions 03-13) and/or Section 01 91 19A Building Enclosure Commissioning Appendix A. In event of test failure, the Contractor shall provide the Owner with the following:
 1. Installer/Manufacturer's response in writing as to the cause of the failure and proposed resolution.
 2. Installer/Manufacturer shall implement their proposed resolution on a representative sample of the product.
 3. The Contractor coordinates and schedules re-testing at their own cost. Re-testing shall be performed by the same Testing Agency that performed the initial testing unless alternate Testing Agency is approved by the owner. This process is repeated until the test result(s) meets or exceeds the requirements of the contract documents and, at the discretion of the Owner, the remedial action taken will be implemented on a project-wide basis where applicable.
 4. The Owner will determine whether a replacement of all identical units is required or if a repair is acceptable.
 5. Upon acceptance, the responsible Party shall replace or repair all identical items at their expense and shall extend the warranty accordingly.
 6. Systemic or frequent failures may result in additional testing beyond originally identified to verify performance.
 7. Based on the type of failure and the rate of frequency, the number of additional tests will be negotiated between the BECxP, the Owner, and the Contractor.
- C. Cost of Retesting and/or Additional Testing:
 1. Contractor is responsible for the cost of all re-tests and additional testing and compensation of time for BECxP related to all additional work necessitated by re-testing or additional testing of specimens, if contractor or subcontractors are responsible for the deficiency. If not responsible, cost recoveries for retesting will be negotiated with Contractor.

1.16 COMMISSIONING REPORT CONTENT

A. Building Enclosure Commissioning Report

1. Maintenance Schedule: Contractor will provide a summary table that indexes the building enclosure component requiring maintenance and indicates the frequency each component will require repair or replacement (i.e. replacement of sealants, gaskets, IGUs, repair of paints or coatings). Contractor will provide subcontractors with an *Excel* spreadsheet that will be completed by each applicable subcontractor and returned to the Contractor for incorporation in the BECx Report by the BECxP.
2. Maintenance Information: Contractor shall provide Maintenance Information for each entry containing the following:
 - a. Product Data Sheet: Provide a summary of performance data.
 - b. Extended Warranty Information: Include all warranties for products, equipment, components, and sub-components whose duration exceeds one year. Include warranties on components with the system they are a part of. Reference all specific operation and maintenance procedures that must be performed to keep the warranty valid.
 - c. Sources of Material: Include reference to contact information where specific materials can be obtained.
 - d. Installation and Maintenance Instructions: For each material, component or system.

B. Construction Documentation

1. Record Drawings: Contractor shall provide an index of all record drawings with drawing number, title, and electronic file name(s) including electronically referenced drawings.
2. Record Specifications: Contractor shall provide a detailed index of the record specification. Include sections and major items in the specification all indexed to the appropriate page number.
3. Approved Product Data and Shop Drawings:
 - a. Contractor shall provide an index of all product data and shop drawings. This shall list all BE materials, components or systems with the associated submittal number.
 - b. Contractor shall organize and compile only approved product data and shop drawings. Providing these in a filing format is acceptable provided all files are identified and organized for easy access.
 - c. Inclusion of any of this information in previous sections of the Commissioning Report does not allow exclusion in this section.
4. Commissioning Record: BECxP shall provide complete commissioning records including all Performance Test documentation, in both written and electronic format at the discretion of the Owner.

PART 2 - PRODUCTS [NOT USED]

PART 3 - EXECUTION [NOT USED]

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SECTION 01 91 19A - Building Enclosure Commissioning Appendix A

TABLE 1: BUILDING ENCLOSURE SYSTEMS TO BE COMMISSIONED					
Notes: 1. Includes BECx Field Testing Requirements based on ASTM E 2813 Building Enclosure Commissioning Requirements: Fundamental Commissioning Level 1. 2. Sampling rates refers to the number of tests per unique type of enclosure element in accordance with requirements of ASTM E2813, unless specified otherwise noted or required. 3. 'Responsible Party' column indicates party responsible for payment of initial field testing effort. Re-testing and additional testing due to failed testing shall be responsibility of the Contractor. Contractor responsible for coordinating and assisting with all field testing activities per Section 01 91 19. (C = Contractor and O=Owner/BECx Provider)					
Specification Section	Product or Assembly to be Tested	Field-Testing	Sampling Rate	Field Test Method / Notes	Responsible party
DIVISION 03 - CONCRETE					
03 3300 – CAST-IN-PLACE CONCRETE		No	NA		NA
DIVISION 04 – MASONRY (NOT USED)					
DIVISION 05 - METALS					
05 4000 – COLD-FORMED METAL FRAMING		No	NA		NA
05 5000 – METAL FABRICATIONS		No	NA		NA
DIVISION 06 – WOOD, PLASTICS, COMPOSITES					
06 1053 – MISCELLANEOUS ROUGH CARPENTRY		No	NA		NA
06 1600 - SHEATHING		No	NA		NA
DIVISION 07 – THERMAL AND MOISTURE PROTECTION					
07 1800 – TRAFFIC COATINGS	Mechanical penthouse floor assembly	Yes	6 locations**	Adhesion: ASTM D 4541 ** Locations selected at the manufacturer's discretion.	C
07 2100 – THERMAL INSULATION	All exterior wall and roof assemblies	No	NA		NA

TABLE 1: BUILDING ENCLOSURE SYSTEMS TO BE COMMISSIONED					
Notes:					
<p>1. Includes BECx Field Testing Requirements based on ASTM E 2813 Building Enclosure Commissioning Requirements: Fundamental Commissioning Level 1.</p> <p>2. Sampling rates refers to the number of tests per unique type of enclosure element in accordance with requirements of ASTM E2813, unless specified otherwise noted or required.</p> <p>3. 'Responsible Party' column indicates party responsible for payment of initial field testing effort. Re-testing and additional testing due to failed testing shall be responsibility of the Contractor. Contractor responsible for coordinating and assisting with all field testing activities per Section 01 91 19. (C = Contractor and O=Owner/BECx Provider)</p>					
Specification Section	Product or Assembly to be Tested	Field-Testing	Sampling Rate	Field Test Method / Notes	Responsible party
07 2713 - MODIFIED BITUMINOUS SHEET AIR BARRIERS	Membrane air, water and vapor barrier, and transitional membrane	Yes	2 each substrate type, each floor 1 each cladding type 1 each wall type	Adhesion: ASTM D 4541 Water Penetration: ASTM E 1105, modified, prior to insulation Air: ASTM E1186	O
07 4313.13 – FORMED METAL WALL PANELS	Wall assembly MTL-4, at mechanical screen and elevator penthouse	No	NA		NA
07 4313.19 – INSULATED METAL WALL PANELS	Wall assembly MTL-3, opposite of Richards Building	No	NA		NA
07 4313.23 – METAL COMPOSITE MATERIAL WALL PANELS	Wall assemblies MTL-1 and MTL-1A, at level 5-7 opaque walls	No	NA		NA
07 5323 – ETHYLENE PROPYLENE DIENE MONOMER ROOFING	Roof assembly RF-1 and RF-2	Yes	100% all roof areas	Infrared Thermography: ASTM C 1153 Alt: Electronic Impedance Moisture Survey ASTM D 7954 when installation substantially complete and at 10-month warranty survey	O
07 6200 – SHEET METAL FLASHING AND TRIM	Metal flashing profiles and gutters/downspouts at helipad	No	NA		NA

TABLE 1: BUILDING ENCLOSURE SYSTEMS TO BE COMMISSIONED					
Notes:					
1. Includes BECx Field Testing Requirements based on ASTM E 2813 Building Enclosure Commissioning Requirements: Fundamental Commissioning Level 1.					
2. Sampling rates refers to the number of tests per unique type of enclosure element in accordance with requirements of ASTM E2813, unless specified otherwise noted or required.					
3. 'Responsible Party' column indicates party responsible for payment of initial field testing effort. Re-testing and additional testing due to failed testing shall be responsibility of the Contractor. Contractor responsible for coordinating and assisting with all field testing activities per Section 01 91 19. (C = Contractor and O=Owner/BECx Provider)					
Specification Section	Product or Assembly to be Tested	Field-Testing	Sampling Rate	Field Test Method / Notes	Responsible party
07 7110 – ROOF SPECIALITIES	Metal parapet coping	No	NA		NA
07 7200 – ROOFING ACCESSORIES	Roof curbs	No	NA		NA
07 9200 – JOINT SEALANTS	Exterior joint sealants	Yes	(10) first 1,000 ft, (1) each 1,000 ft thereafter- for each sealant type at each condition.	Adhesion/ cohesion: ASTM C1193	O
07 9500 – EXPANSION CONTROL	Expansion joint between existing Richards Building and the East Tower.	No	NA		NA
DIVISION 8 - OPENINGS					
08 1113 – HOLLOW METAL DOORS AND FRAMES		No	NA		NA
08 4413 – GLAZED ALUMINUM CURTAIN WALLS	Types: (1) 4-sided captured & (2) 2-sided SSG Completed assemblies to be tested with all perimeter flashing and gasketing installed.	Yes	3** (6 total for sampling of each type of CW system	Water: ASTM E 1105, AAMA 501.2 Air: ASTM E783, E1186 ** Test 1 at start of installation (first-in-place), Test 2 at 25% completion, Test 3 at 50% completion	O

TABLE 1: BUILDING ENCLOSURE SYSTEMS TO BE COMMISSIONED

Notes:

1. Includes BECx Field Testing Requirements based on ASTM E 2813 Building Enclosure Commissioning Requirements: Fundamental Commissioning Level 1.
2. Sampling rates refers to the number of tests per unique type of enclosure element in accordance with requirements of ASTM E2813, unless specified otherwise noted or required.
3. 'Responsible Party' column indicates party responsible for payment of initial field testing effort. Re-testing and additional testing due to failed testing shall be responsibility of the Contractor. Contractor responsible for coordinating and assisting with all field testing activities per Section 01 91 19. (C = Contractor and O=Owner/BECx Provider)

Specification Section	Product or Assembly to be Tested	Field-Testing	Sampling Rate	Field Test Method / Notes	Responsible party
08 8000 – GLAZING		No	NA		NA
08 8113 – DECORATIVE GLASS GLAZING		No	NA		NA

TABLE 2: BECX FIELD TESTING STANDARDS GLOSSARY

→ ASTM C67 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile
→ ASTM C794 Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
→ This is a laboratory test
→ ASTM C1153 Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging
→ ASTM C1193 - 11a Standard Guide for Use of Joint Sealants
→ Method A, Field-Applied Sealant Joint Hand Pull Tab
→ ASTM C1153 Practice for Location of Wet Insulation in Roofing Systems Using Infrared Camera
→ ASTM C1401 Standard Guide for Structural Sealant Glazing
→ ASTM C1521 Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints
→ ASTM C1715 Standard Test Method for Evaluation of Water Leakage Performance of Masonry Wall Drainage Systems
→ ASTM D4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
→ ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
→ ASTM D5957 Standard Guide for Flood Testing Horizontal Waterproofing Installations
→ ASTM D7877 Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes
→ ASTM D7954 Standard Practice for Moisture Surveying of Roofing Waterproofing Systems Using Non-Destructive Electrical Impedance Scanners
→ ASTM E122 Standard Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process
→ ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
→ ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
→ ASTM E783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
→ ASTM E1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
→ ASTM E1186 Practices of Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
→ ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
→ ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
→ AAMA 501.2-09 Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls and Sloped Glazing Systems

END OF SECTION

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 10 00 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Section 01 73 00 "Execution" for cutting and patching procedures.
 - 3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 4. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.5 ACTION SUBMITTALS

- A. LEED Submittals:
 - 1. Qualification Data: For refrigerant recovery technician.
 - 2. Waste management submittals, as outlined in Section 017419 - Construction and Demolition Waste Management and Disposal.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.

3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 "Photographic Documentation." Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.
- 1.7 CLOSEOUT SUBMITTALS
- A. Inventory: Submit a list of items that have been removed and salvaged.
- 1.8 QUALITY ASSURANCE
- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- 1.9 FIELD CONDITIONS
- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
1. Hazardous materials will be removed by Owner before start of the Work.
 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.11 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.
- B. Coordinate roofing, roof flashings, copings and related Work removals with installation of new roofing, flashings, copings, etc, to keep building and building elements to be retained as a portion of the completed Work protected.
- C. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
- D. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.
- C. LEED Performance Requirements.
 - 1. Selective demolition activities shall meet the Owner's established Project Diversion Goal, as outlined in Section 01 74 19 - CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT AND DISPOSAL.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings preconstruction photographs or video and templates.
 - 1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."
 - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

- a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
- b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
- c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area off-site, designated by Owner.
 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least **3/4 inch (19 mm)** at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 74 19 "Construction Waste Management and Disposal."
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.9 SELECTIVE DEMOLITION SCHEDULE

- A. Items indicated on the Drawings.

END OF SECTION

SECTION 05 31 00

STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to other Divisions of these Specifications to determine the type and extent of work therein affecting the work of this trade, whether or not such work is specifically mentioned in this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Roof deck.
 - 2. Composite floor deck.
 - 3. Field-installed headed shear stud connectors.
 - 4. Cutting and reinforcing of openings for predetermined holes and other holes required by other trades.
 - 5. Furnishing and installing filler plates as noted in the drawings, and as may be required to close gaps between decking and structural steel.
 - 6. Furnishing and installing end closures, pour stops, and roof drain sump pans.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 74 19 – Construction and Demolition Waste Management and Disposal, for disposal of construction, demolition and packaging waste disposal requirements.
 - 2. Section 01 81 13 – Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction, for sustainable design requirements and detailed sustainable design submittal requirements

3. Section 03 30 00 – Cast-in-Place Concrete, for normal-weight and lightweight structural concrete fill over steel deck, concrete fill, and reinforcing steel.
4. Section 05 12 00 – Structural Steel Framing, for shop- and field-welded shear connectors.
5. Section 05 50 00 – Metal Fabrications, for framing deck openings with miscellaneous steel shapes.
6. Section 05 51 13 – Metal Pan Stairs
7. Section 07 81 00 – Applied Fireproofing, for surface preparation for metal deck to be fireproofed.
8. Section 09 91 00 – Interior Painting, for repair painting of primed deck and finish painting of deck.

1.3 REFERENCE STANDARDS

- A. Comply with the following general specifications for materials and workmanship not otherwise specified:
 1. AISI Specification for the Design of Cold-Formed Steel Structural Members.
 2. AWS Recommended Welding Practices.
 3. SDI Code of Recommended Standard Practice.
 4. SDI Specifications and Commentaries for Composite Steel Floor Deck.
 5. SDI Specifications and commentaries for Steel Roof Deck.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Sustainability (LEED v4) Submittals:
 1. LEED Product Submittals.
 2. Construction Waste Management, Credit: Submit documentation indicating weight of steel deck waste material recycled.
 3. Product Data for Recycled Content, Credit: For products having recycled content, submit documentation indicating percentages by weight of postconsumer and preconsumer recycled content in each product. Include a statement indicating costs for each product having recycled content.
 4. Product Data for Regional Materials, Credit: For products gathered and manufactured locally, submit documentation indicating percentages by weight of materials gathered and manufactured locally. Include a statement indicating costs for each product submitted for this credit.
- C. Shop Drawings:
 1. Submit shop drawings per Section 01 33 00 – Submittal Procedures.
 2. The Contractor shall make all submittals in electronic PDF file format and shall include the Structural Engineer of Record's (SER) submittal review stamp in each PDF file. The SER will only return PDF files to the Contractor.
 3. Precheck the shop drawings prior to submission to the Architect and SER for conformance of details to the Contract Documents and as coordinated with other work. The signature of a representative of the Contractor indicating that the Drawings have been prechecked will be required. The Contractor shall be wholly responsible for the conformance of dimensions and details of the shop drawings to the Contract Documents

4. Show layout, types, gauges, and marking of all deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.
5. Show fastening methods for deck units, accessories, closure pieces, fittings, sump pans, and the type and sequence of connections, welds, or screws.
6. Indicate any single-span conditions requiring shoring.
7. Show size, location, and spacing of field-welded shear studs.
8. Approval of shop drawings will be for size and arrangement of units and strength of connections. The Contractor is responsible for accuracy of all dimensions shown on shop drawings.
9. Do not fabricate units prior to approval of shop drawings by SER.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates: Copies of certificates for welding procedures and personnel.
- B. Product Certificates: Signed by the manufacturers certifying that products furnished comply with the requirements of the Contract Documents.
- C. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with the requirements of the Contract Documents, based on comprehensive testing of current products:
 1. Mechanical fasteners.
- D. Evaluation Reports: Evidence of steel deck's compliance with the 2015 International Building Code.
- E. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has a minimum of 3 years of experience completing steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Testing Agency Qualifications: An independent testing agency employed by the Owner, acceptable to authorities having jurisdiction, qualified according to ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1 – Structural Welding Code – Steel, and AWS D1.3 – Structural Welding Code – Sheet Steel.
- D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E119 by a testing and inspection agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's Fire Resistance Directory or from the listings of another testing and inspecting agency.
 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.
- E. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials".
- F. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's Specification for the Design of Cold-Formed Steel Structural Members.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
- C. Clean metal deck and accessories of dust, grease, oils, loose materials, and any other material that impairs the adhesion of insulation and accessories, sprayed-on fireproofing, and concrete.

PART 2 - PRODUCTS

2.1 SUSTAINABILITY CRITERIA

- A. Construction Waste Management (LEED v4 Credit): Steel deck waste material shall be source separated and recycled.
- B. Recycled Content of Steel Products: Structural steel materials must meet the requirements of LEED v4, Recycled Content. Provide structural steel products with an average postconsumer recycled content of at least 50%.
- C. Regional Materials: Steel materials shall be fabricated regionally and must be composed of materials gathered and recycled local to the project to meet the requirements of LEED v4 Credit, Regional Materials.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with the project requirements, provide products by one of the following:
1. Steel Deck:
 - a. New Millennium Building Systems LLC
 - b. Nucor Corp.; Vulcraft Division.
 - c. United Steel Deck division of Canam Group.
 2. Headed-Stud Shear Connectors:

- a. Nelson Stud Welding Company.
3. Floor and Roof Deck Side-Lap Fasteners:
 - a. Elco Industries.
 - b. Hilti.

2.3 ROOF DECK

- A. FM Approved Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G90 zinc coating.
 2. Deck Profile: Type 3DR, deep rib.
 3. Profile Depth: As indicated on the Contract Documents.
 4. Design Uncoated-Steel Thickness: As indicated on the Contract Documents.
 5. Span Condition: Double span or more.
 6. Side Laps: Overlapped and fastened with side-lap screws (crimped or button-punch side laps are prohibited).

2.4 COMPOSITE FLOOR DECK

- A. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
 1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G60 zinc coating.
 2. Profile Depth: As indicated on the Contract Documents.
 3. Design Uncoated-Steel Thickness: As indicated on the Contract Documents.
 4. Span Condition: Double span or more.
 5. Side Laps: Overlapped and fastened with side-lap screws (crimped or button-punched side laps are prohibited).

2.5 HEADED-STUD SHEAR CONNECTORS

- A. Shear Connectors:
 1. Nelson Type S3L with Nelson welding process.
 2. Approved equivalent complying with the following: ASTM A108, Grades 1010 through 1020, headed-stud type, cold-finished carbon steel, AWS D1.1, Type B.
- B. Dimensions: Length and diameter as indicated. Head dimensions to comply with AISC Specifications.
- C. Accessories: Provide arch shields (ferrules) specifically designed for welding through hot-dipped galvanized metal deck of the type specified.

2.6 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated. Design and provide galvanized sheet steel closures and cover plates as required at columns, to close panels, and at conditions where panels change direction, abut or end; including perimeters of all stair openings, mechanical openings, slab depressions, and other areas where edge forms are required. Provide miscellaneous light angles to support closures wherever required.
- B. Floor and Roof-Deck Side-Lap Fasteners: FM Approved Corrosion-resistant hexagonal washer head; self-drilling, carbon-steel screws, minimum diameter as indicated.
 - 1. Dril-Flex by Elco Industries.
 - 2. Kwik-flex by Hilti.
 - 3. Approved fastener with same or greater strength, toughness, resistance to hydrogen embrittlement, hydrogen-assisted stress corrosion cracking, and durability.
- C. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise noted.
- D. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 40,000 psi, of same material and finish as deck, and of thickness and profile SDI Code of Standard Practice for overhang and slab depth.
- E. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- F. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber flute fillers to fit deck profiles for use at tops of partitions where required for acoustic closure of partitions.
- G. Recessed Sump Pans: Single-piece steel sheet, 14 ga. minimum thickness, of same material and finish as deck, with 3 in. wide flanges and level recessed pans of 1-1/2 in. minimum depth. For drains, cut holes in the field.
- H. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94% zinc dust by weight.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to manufacturer's approved shop drawings, applicable specifications and commentary in SDI Code of Standard Practice, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if indicated on the shop drawings for single-span conditions or if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Field Welding: Perform field welding with prequalified personnel executing prequalified procedures referenced in Quality Assurance Section.

3.3 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 in. long, and as follows:
 - 1. Weld Diameter: 5/8 in., nominal.
 - 2. Weld Spacing: Space welds as indicated, but in no case further apart than 24 in.
 - 3. Side-Lap and Perimeter-Edge Fastening: As indicated in the Drawings.
- B. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 in., with end joints as follows:
 - 1. End Joints: Butted.
- C. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 in. apart with at least one weld at each corner.

- D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

3.4 FLOOR-DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: 5/8 in., nominal.
 - 2. Weld Spacing: Space and locate welds as indicated on the Contract Drawings.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of as indicated, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 in., with end joints butted. Do not overlap deck panels.
 - 1. End Joints: Butted.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck. Weld cover plates at changes in direction of floor-deck panels, unless otherwise indicated.

3.5 FIELD QUALITY CONTROL

- A. The Owner will employ a Special Inspector and an independent Testing Agency to perform special inspections and testing, and to submit full reports of each inspection and test conducted. The Contractor will provide access to the Special Inspector, the Testing Agency, and the SER, as required. Inspections and tests by the Special Inspector and the Testing Agency will not relieve the Contractor of responsibility for supervision and quality control of the Work. Refer to Structural Special Inspections and Procedures that are part of the drawings for testing and inspection specific requirements.
- B. Field welds will be subject to inspection.
- C. Headed shear-connector stud welds will be inspected and tested according to AWS D1.1 for stud welding.
- D. The Special Inspector and the Testing Agency will report results promptly and in writing to Contractor, Architect, and SER within two business days and to the building official upon request.
- E. Remove and replace work that does not comply with specified requirements. The Special Inspector and the Testing Agency shall re-inspect all nonconforming

construction and prepare a written report of the re-inspection within two business days of the re-inspection.

- F. Additional testing and inspecting, at the Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

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SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior non-load-bearing wall framing.
2. Soffit framing.
3. Thermal spacer system.
4. Exterior Z furring.
5. Exterior hat furring channels.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification..

C. Related Requirements:

1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements
4. Section 05 50 00 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
5. Section 07 42 13.13 "Formed Metal Wall Panels" for panels supported by thermal support spacer system.
6. Section 07 42 13.23 "METAL COMPOSITE MATERIAL WALL PANELS" for panels supported by thermal support spacer system.
7. Section 09 21 16.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies, with height limitations.
8. Section 09 22 16 "Non-Structural Metal Framing" for standard, interior non-load-bearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- A. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- C. Samples for verification: Thermal support system and accessories.
- D. Delegated-Design Submittal: For cold-formed steel framing and for thermal spacer system.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.

- B. Welding certificates.
 - C. Product Certificates: For each type of code-compliance certification for studs and tracks.
 - D. Product Test Reports: For each listed product, for tests performed by [manufacturer and witnessed by a qualified testing agency] [a qualified testing agency].
 - 1. Steel sheet.
 - 2. Expansion anchors.
 - 3. Power-actuated anchors.
 - 4. Mechanical fasteners.
 - 5. Vertical deflection clips.
 - 6. Horizontal drift deflection clips
 - 7. Miscellaneous structural clips and accessories.
 - 8. Thermal spacer system.
 - E. Evaluation Reports: For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
 - 1. For non-standard cold-formed steel framing, from ICC-ES.
 - 2. For continuous insulation thermal support system, from ICC-ES.
- 1.5 QUALITY ASSURANCE
- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
 - B. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
 - C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - D. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.
 - E. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
 - F. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."
 - G. Mockups: Provide cold formed metal framing for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.

- H. Mockups: See Section 01 45 34 "Mockups" for mockups requiring cold formed metal framing.

1.6 COORDINATION

- A. Coordinate the Work of this Section with requirements of Sections specifying panels supported by thermal support system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of design Manufacturer: Subject to compliance with requirements, provide metal framing products by Clark Dietrich Metal Framing, Mill Certified, or comparable products by one of the following:
 1. Clark Dietrich Metal Framing; a Worthington Industries Company.
 2. MarinoWARE.
 3. SCAFCO Corporation.
 4. Steel Network, Inc. (The).

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing and thermal spacer system capable of withstanding design loads within limits and under conditions indicated.
 1. Design Loads: As indicated on Drawings.
 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/240 of the wall height.
 - b. Soffit Joist Framing: Vertical deflection of 1/240 of the span for live loads and 1/175 for total loads of the span.
 - c. Horizontal framing members: Deflection normal to the plane of construction shall not exceed 1/240 of the clear span; deflection in the plane of construction shall not exceed 1/360 of the span between supports, or 1/8 inch, whichever is less
 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 3/4 inch (19 mm).
 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

- C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
 - 1. Wall Studs: AISI S211.
 - 2. Headers: AISI S212.
 - 3. Lateral Design: AISI S213.
- D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- E. LEED Performance Requirements:
 - 1. Provide cold formed metal framing products with both of the following:
 - a. Third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
 - b. Manufacturer's product specific Health Product Declarations (HPDs) with full disclosure of known health hazards.
 - 2. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings related to work of this Section, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.3 COLD-FORMED STEEL FRAMING MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - 1. Grade: **ST33H (ST230H)** or **ST50H (ST340H)** As required by structural performance.
 - 2. Coating: **G90 (Z275)** or equivalent.
- C. Steel Sheet for Vertical Deflection and DriftClips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: **33 (230)** or **50 (340)**, Class 1 As required by structural performance.
 - 2. Coating: **G90 (Z275)**.

2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: **0.0538 inch (1.37 mm)**.
 - 2. Flange Width: **1-5/8 inches (41 mm) minimum**.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: **0.0538 inch (1.37 mm)**.
 - 2. Flange Width: **1-1/4 inches (32 mm) minimum**.

- C. Vertical Deflection Clips: Manufacturer's standard bypass or headclips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
 - 1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
 - b. Flange Width: 1 inch (25 mm) plus twice the design gap for other applications.
 - 2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
 - b. Flange Width: Dimension equal to sum of outer deflection track flange width plus 1 inch (25 mm).
- E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.5 SOFFIT JOIST FRAMING

- A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
 - 2. Flange Width: 1-5/8 inches (41 mm), minimum.

2.6 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. End clips.
 - 6. Foundation clips.
 - 7. Gusset plates.
 - 8. Stud kickers and knee braces.
 - 9. Joist hangers and end closures.
 - 10. Hole-reinforcing plates.
 - 11. Backer plates.

2.7 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 ICC-ES AC193 ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.
 - 1. Uses: Securing cold-formed steel framing to structure.
 - 2. Type: Torque-controlled expansion anchor Torque-controlled adhesive anchor or adhesive anchor.
 - 3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, unless otherwise indicated.
 - 4. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group **1 (A1)** stainless-steel bolts, **ASTM F 593 (ASTM F 738M)**, and nuts, **ASTM F 594 (ASTM F 836M)**.
- D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.
- E. Welding Electrodes: Comply with AWS standards.

2.8 CONTINUOUS INSULATION THERMAL SUPPORT SYSTEM

- A. Basis of Design: Subject to compliance with the requirements, provide Cascadia Windows Inc., Cascadia Clip, www.cascadiaclick.com or a comparable product by a manufacturer acceptable to the Architect.
 - 1. Acceptable Manufacturers:
 - a. Knight Wall systems.
- B. Sub-framing Thermal Spacer: 100% Pultruded glass fiber and thermoset polyester resin insulation clip.
 - 1. Thermal Spacer thickness for top, base and web: 3/16 inches nominal.
 - 2. Thermal spacer depth: As indicated on the Drawings.
 - a. Depth tolerance: ± 0.005 inches.
- C. Spacer Fasteners: High hex head washer head with sharp twin lead threaded design of heat treated corrosion resistant coated steel.
 - 1. Fastener for steel framing: 1/4 - 14 x length required, with hex head.
 - a. Acceptable material: Leland Industries Inc., Master Driller™ No. 2 Mini Drill Point with DT2000 coating.
 - 2. Fastener for cast-in-place concrete and concrete masonry units: 1/4 - 15 x length required, concrete screw with hex head.
 - a. Acceptable material: Leland Industries Inc., Concrete Screw with DT2000 coating.
 - b. Embedment depth: 1 1/2 inches, except when into hollow concrete masonry unit, not less than 1 inch.

- D. Exterior Z furring: Manufacturer's standard Z-shaped steel channel, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: As required by design and performance requirements, but not less than 0.0538 inch (1.37 mm).
- E. Exterior hat furring channels: Manufacturer's standard Z-shaped steel channel, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: As required by design and performance requirements, but not less than 0.0538 inch (1.37 mm).

2.9 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780/A 780M or SSPC-Paint 20.
- B. Cement Grout: Portland cement, ASTM C 150/C 150M, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30-minute working time.
- D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.10 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of **1/8 inch in 10 feet (1:960)** and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus **1/8 inch (3 mm)** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of **1/8 inch (3 mm)**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than **1/4 inch (6 mm)** to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding **1/16 inch (1.6 mm)**.
 - D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
 - E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
 - F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
 - G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
 - H. Install insulation, specified in Section 07 21 00 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
 - I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- 3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION
- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
 - B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: **16 inches (406 mm)**.
 - C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
 - D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install double deep-leg deflection tracks and anchor outer track to building structure.

2. Connect vertical deflection clips to bypassing studs and anchor to building structure.
 3. Connect drift clips to cold-formed steel framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than **48 inches (1220 mm)** apart. Fasten at each stud intersection.
1. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
1. Install joists over supporting frame with a minimum end bearing of **1-1/2 inches (38 mm)**.
 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.
- C. Space joists not more than **2 inches (51 mm)** from abutting walls, and as follows:
1. Joist Spacing: **16 inches (406 mm)**.
- D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.
1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
1. Combination Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.
- G. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.6 THERMAL SUPPORT SYSTEM INSTALLATION

- A. Install continuous insulation thermal support system in accordance with manufacturer's instructions and approved shop drawings.
- B. Establish level lines for panel coursing and positioning of Brackets/support rails.
- C. Brackets/Support rails: Attach Brackets/rails with engineered fasteners and anchors to accomplish performance requirements.
 - 1. Attach brackets/rails to substrate at a distance recommended in accordance with lateral loads and system dead load requirements or as shown on drawings.

3.7 ERECTION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of **1/8 inch in 10 feet (1:960)** and as follows:
 - 1. Space individual framing members no more than plus or minus **1/8 inch (3 mm)** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.8 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel framing and supports for mechanical and electrical equipment.
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
3. Metal ladders.
4. Ladder safety cages.
5. Metal ships' ladders and pipe crossovers.
6. Metal floor plate and supports.
7. Roof and floor opening frames.
8. Gratings and support.
9. Bench supports.
10. Miscellaneous angles, shapes and fabrications shown on the Drawings.
11. All anchors, framing, fasteners and accessories for installation of the above.
12. Loose bearing and leveling plates for applications where they are not specified in other Sections.
13. Design calculations for those items required to have such.

B. Products furnished, but not installed, under this Section:

1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification..

D. Related Sections:

1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
2. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.

4. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
5. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
6. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
7. Division 05 Section "Structural Steel Framing."
8. Division 05 Section "Metal Stairs."
9. Division 05 Section "Pipe and Tube Railings."
10. Division 05 Section "Decorative Formed Metal."
11. Division 05 Section "Fabricated Metal Systems."
12. Division 09 Section "Painting" finish painting.
13. Division 09 Section "High-Performance Coatings."

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal fabrications, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance of Ladders: Ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- D. Structural Performance: Provide metal fabrications and connections capable of withstanding the following design loads within limits and under conditions indicated:
 1. Loads: As indicated.
 2. Dead Loads: As indicated on the Structural drawings.
 3. Live Loads: As indicated on the Structural drawings
 4. Wind Loads: Wind-load criteria, As indicated on the Structural Drawings, and as required by applicable building code or ASCE 7, including basic wind speed, importance factor, exposure category, and pressure coefficient.
 5. Seismic Loads: As indicated on the Structural drawings.
 6. Project Specific Loads: As indicated on the Drawings.
- E. Gratings and Supports, Floor Plates and Supports:
 1. Pedestrian Traffic: Provide sizes and spacing of bars as required to support a minimum live load of 100 lbs. per sq. ft., or concentrated load of 2,000 lbf., whichever produces the greater stress.
 2. Vehicular Traffic: Provide sizes and spacing of bars as required to support a uniform load of 250 lbf/sq. ft. or concentrated load of 8,000 lbf, whichever produces the greater stress.
- F. Supports for Benches:

1. Dead load of bench.
2. Uniform Load: 100 pounds per linear foot of bench.
3. Concentrated Load Downward: 300 pounds at any point on the bench.
4. Limit deflection to L/360 between supports.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Paint products.
 2. Grout.
- A. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
 - 6) Furniture.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

2. Shop drawings for work requiring delegated design submittal are to be prepared, and sealed or certified by the qualified professional engineer responsible for their preparation.
 - C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed or certified by the qualified professional engineer responsible for their preparation.
 - D. Design Calculations: Submit design calculations for the following:
 1. Gratings and supports.
 2. Bench support framing.
 3. Ladders.
 4. Metal floor plates and supports.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For qualified professional engineer.
 - B. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.
 - C. Welding certificates.
 - D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.
- 1.5 QUALITY ASSURANCE
- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a 5 year record of successful in-service performance, as well as sufficient production capacity to produce required units.
 - B. Metal Bar Grating Standards: Comply with applicable requirements of the following:
 1. Non-Heavy-Duty Metal Bar Gratings: Comply with NAAMM MBG 531, "Metal Bar Grating Manual for Steel, Stainless Steel, and Aluminum Gratings and Stair Treads."
 - C. Qualifications for Welding Work:
 1. Qualify welding processes and welding operators in accordance with the AWS, Standard Qualification Procedure.
 2. Provide certification that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous twelve (12) months. Provide recertification of welders as required.
 - D. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 3. AWS D1.3, "Structural Welding Code--Sheet Steel."
 4. AWS D1.6, "Structural Welding Code - Stainless Steel."
 - E. Comply with AISC Manual, current edition.
 1. Code of Standard Practice for Steel Buildings and Bridges.

2. Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
 - F. Specifications for Structural Joints Using ASTM A 325 Bolts or ASTM A 490 High Strength Steel Bolts as approved by the Research Council on Structural Connections of the Engineering Foundation.
 - G. General Requirements for Delivery of Rolled Steel Plates, Shapes, and Bars for Structural Use: ASTM A 6.
 - H. Mockups: Provide metal fabrications for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 1. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring metal fabrications.
 - a. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 2. See Section 01 45 34 "Mockups for Exterior Wall Systems." for mockups requiring metal fabrications.
- 1.6 PROJECT CONDITIONS
- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.
 - B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 1. Provide allowance for trimming and fitting at site.
- 1.7 COORDINATION
- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
 - B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Products: Subject to compliance with requirements, provide one of the products specified.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. LEED Performance Requirements:
 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings related to work of this Section, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. For metal fabrications that are part of interior wall or ceiling assemblies, provide products that meet requirements for emissions testing (General Emissions Evaluation) or are inherently non-emitting materials, as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.3 FERROUS METALS

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Bars for Grating: ASTM A 569 or ASTM A 36.
- D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- E. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- F. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.
- G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm).
 2. Material: Galvanized steel, ASTM A 653/A 653M, commercial steel, Type B, with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.
- H. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.4 ALUMINUM

- A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

- D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.5 STAINLESS STEEL

- A. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- B. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

2.6 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6)**; with hex nuts, **ASTM A 563 (ASTM A 563M)**; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 325, Type 3 (ASTM A 325M, Type 3)**; with hex nuts, **ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3)**; and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, **ASTM F 593 (ASTM F 738M)**; with hex nuts, **ASTM F 594 (ASTM F 836M)**; and, where indicated, flat washers; Alloy Group **1 (A1)**.
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Eyebolts: ASTM A 489.
- G. Machine Screws: **ASME B18.6.3 (ASME B18.6.7M)**.
- H. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.
- I. Plain Washers: Round, **ASME B18.22.1 (ASME B18.22M)**.
- J. Lock Washers: Helical, spring type, **ASME B18.21.1 (ASME B18.21.2M)**.
- K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- L. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- M. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).
 - N. Power Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with capability to sustain, without failure, a load equal to ten (10) times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency. Provide manufacturer's substantiating data for each type and condition used as part of submittals.
 - O. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.
 - P. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
 - Q. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with paints specified to be used over it and with a total VOC of less than 100 g/l.
 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
 - R. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
 - S. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
 - T. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
 - U. Concrete: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa) unless otherwise indicated.
- 2.7 FABRICATION, GENERAL
- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
 - B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
 - C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - D. Form exposed work with accurate angles and surfaces and straight edges.
 - E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, **1/8 by 1-1/2 inches (3.2 by 38 mm)**, with a minimum **6-inch (150-mm)** embedment and **2-inch (50-mm)** hook, not less than **8 inches (200 mm)** from ends and corners of units and **24 inches (600 mm)** o.c., unless otherwise indicated.

2.8 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
1. Fabricate units from slotted channel framing where indicated.
 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports exposed on the building exterior, built into building exterior walls, and where indicated.

2.9 METAL LADDERS

- A. General:
1. Comply with 29 CFR 1910.27(d)(5) and ANSI A14.3 unless otherwise indicated.
- B. Aluminum Ladders:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ACL Industries, Inc.
 - b. Alco-Lite Industrial Products.
 - c. Halliday Products.
 - d. O'Keeffe's Inc.

- e. Precision Ladders, LLC.
 - f. Royalite Manufacturing, Inc.
2. Space siderails **18 inches (457 mm)** apart unless otherwise indicated.
 3. Siderails: Continuous extruded-aluminum channels or tubes, not less than **2-1/2 inches (64 mm)** deep, **3/4 inch (19 mm)** wide, and **1/8 inch (3.2 mm)** thick.
 4. Rungs: Extruded-aluminum tubes, not less than **3/4 inch (19 mm)** deep and not less than **1/8 inch (3.2 mm)** thick, with ribbed tread surfaces.
 5. Fit rungs in centerline of siderails; fasten by welding or with stainless-steel fasteners or brackets and aluminum rivets.
 6. Provide platforms as indicated fabricated from pressure-locked aluminum bar grating or extruded-aluminum plank grating, supported by extruded-aluminum framing. Limit openings in gratings to no more than **3/4 inch (19 mm)** in least dimension.
 7. Support each ladder at top and bottom and not more than **60 inches (1500 mm)** o.c. with welded or bolted aluminum brackets.
 8. Provide minimum **72-inch- (1830-mm-)** high, hinged security door with padlock hasp at foot of ladder to prevent unauthorized ladder use.

2.10 LADDER SAFETY CAGES

A. General:

1. Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or with stainless-steel fasteners.
2. Provide primary hoops at tops and bottoms of cages and spaced not more than **20 feet (6 m)** o.c. Provide secondary intermediate hoops spaced not more than **48 inches (1200 mm)** o.c. between primary hoops.
3. Fasten assembled safety cage to ladder rails and adjacent construction by welding or with stainless-steel fasteners unless otherwise indicated.

B. Aluminum Ladder Safety Cages:

1. Primary Hoops: **1/4-by-4-inch (6.4-by-100-mm)** flat bar hoops.
2. Secondary Intermediate Hoops: **1/4-by-2-inch (6.4-by-50-mm)** flat bar hoops.
3. Vertical Bars: **1/4-by-2-inch (6.4-by-50-mm)** flat bars secured to each hoop.

2.11 METAL SHIPS' LADDERS AND PIPE CROSSOVERS

- A. Provide metal ships' ladders and pipe crossovers where indicated. Fabricate of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.
 1. Fabricate ships' ladders and pipe crossovers, including railings from steel.
 2. Fabricate treads and platforms from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than **1/2 inch (12 mm)** in least dimension.
 3. Comply with applicable railing requirements in Division 05 Section "Pipe and Tube Railings."
- B. Galvanize exterior steel ships' ladders and pipe crossovers, including treads, railings, brackets, and fasteners.

2.12 GRATINGS AND SUPPORTS

- A. Provide bar gratings and frames of sizes and at locations shown on the Drawings. Galvanize exterior gratings and accessories. Provide concealed fastenings as indicated.
- B. Fabricate unit with main bars and cross bars of rectangular cross-section, with flush top, slotted construction, mechanically interlocked and welded. Provide patterns, spacing and bar sizes indicated on the Drawings or required by loads, complying with NAAMM, Metal Bar Grating Manual, current edition.
- C. Comply with FS-RR-G-661C, Type I. Provide steel supporting members as indicated or required, using welded construction to the extent feasible. Form gratings into sections as indicated or as necessary for proper access and handling.
- D. Form banded edges on all panels and around all openings through panels.
- E. Removable Grating Sections: Fabricate with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated or, if not indicated, as recommended by manufacturer for attaching to supports.
- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.
- G. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.
 - 1. Edge-band openings in grating that interrupt four or more bearing bars with bars of same size and material as bearing bars.
- H. Frames and Supports for Metal Gratings: Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.

2.13 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim.

2.14 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.

2.15 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches (200 mm) unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

2.16 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.17 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Prepare exposed surfaces for finishing by removing tool and die marks and stretch lines, and to blend into surrounding surface.

2.18 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer unless indicated.
 - 2. Shop prime materials indicated to receive "High Performance Coatings" with primer indicated for use in Section 09 96 00 "High Performance Coatings."
- C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
- E. Shop Priming: Prepare for and apply shop primer to materials indicated to receive high performance coatings to comply with requirements of in Section 09 96 00 "High Performance Coatings."

2.19 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.
- D. Non-directional, fine-grained, glass bead-blasted finish to match Architect's sample.
- E. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions and for suspended toilet partitions securely to and rigidly brace from building structure.

3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum **2.0-mil (0.05-mm)** dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. The testing laboratory will make inspections and perform tests in accordance with the following:
 - 1. Verify that certification of welders is not more than one year prior to time welding work is to be performed.
 - 2. Visually inspect all shop and field welds. Conform with AWS D1.1., Structural Welding Code for Steel, current edition.
 - 3. Test bolted connections made either in the shop or in the field in accordance with the following:
 - a. Test bolted connections by the calibrated wrench method as outlined in the Specifications for Assembly of Structural Joints Using High Strength

Steel Bolts hereinbefore specified. The testing laboratory is responsible for the proper calibration of the wrench used.

- b. Test 10 percent of all installed bolts as specified, with a minimum of two (2) bolts for each connection being tested.

- C. Correct deficiencies in metal fabrication work which inspections and tests have indicated to be in non-compliance with the requirements of the Contract Documents. Perform additional tests, at Contractor's expense as may be necessary to reconfirm any noncompliance or original work, and as may be necessary to show compliance of corrected work.

END OF SECTION

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SECTION 05 51 13

METAL PAN STAIRS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Preassembled steel stairs with concrete-filled treads.
 - 2. Steel tube railings attached to metal stairs.
 - 3. Steel tube handrails attached to walls adjacent to metal stairs.
 - 4. Design calculations for the above.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Division 03 Section "Cast-in-Place Concrete" for concrete fill for stair treads and platforms.
 - 2. Division 05 Section "Pipe and Tube Railings" for pipe and tube railings not attached to metal stairs or to walls adjacent to metal stairs.
 - 3. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking for anchoring railings.
 - 4. Division 09 Section "Non-Structural Metal Framing" for metal backing for anchoring railings.
 - 5. Division 10 Section "Photoluminescent Exit Path Marking" for stair nosings and handrail marking strips.
 - 6. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 7. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal stairs, including comprehensive engineering analysis by a qualified professional engineer, licensed in the State of Maine, using performance requirements and design criteria indicated.

- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Uniform Load: 100 lbf/sq. ft. (4.79 kN/sq. m).
 2. Concentrated Load: 300 lbf (1.33 kN) applied on an area of 4 sq. in. (2580 sq. mm).
 3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Seismic loads: As indicated on the Drawings.
 5. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 6. Limit deflection of treads, platforms, and framing members to L/240 or 1/4 inch (6.4 mm), whichever is less.
- C. Structural Performance of Railings: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
 - b. Infill load and other loads need not be assumed to act concurrently.
- D. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Component Importance Factor is 1.25.

1.3 ACTION SUBMITTALS

- A. Product Data: For metal stairs and the following:
1. Paint products.
 2. Grout.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.

- 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
1. Provide shop drawings sealed and signed by the same State of Maine Licensed Professional Engineer that prepared calculations.
- D. Samples for Initial Selection: For products involving selection of color, texture, or design.

1.4 INFORMATIONAL SUBMITTALS

- A. Delegated-Design Submittal: For metal stairs to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Calculations: Submit design calculations prepared and sealed by a State of Maine licensed professional engineer. Design stairs, landings, railings, their support framing, fasteners and anchors in accordance with the performance requirements and loading criteria specified herein, code and other requirements. Submit calculations for the following:
 - a. Straight runs.
 - b. Platforms and landings.
 - c. Anchorage.
 - d. Handrails and guardrails.
- B. Qualification Data: For qualified manufacturer/fabricator and professional engineer.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide manufactured steel stairs by a firm producing the types of stair and railing systems required for not less than ten (10) consecutive years, with not less than five (5) similar projects that have been in successful use for not less than five (5) years.
- B. Installer Qualifications: Fabricator of products.

- C. Installer Qualifications:
 - 1. Minimum five (5) consecutive years experience in the successful installation of steel stair and railing systems of the type indicated for this project.
 - 2. The Installer is to be acceptable to the Manufacturer of the stair system and the Architect. The Manufacturer is to provide written assurance to the Architect of the installer acceptability upon request.
- D. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Preassembled Stairs: Commercial class.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- F. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 60 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- D. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, **Grade 25 (Grade 170)**, unless another grade is required by design loads; exposed.
- E. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, either commercial steel, Type B, or structural steel, **Grade 30 (Grade 205)**, unless another grade is required by design loads.

2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6)**; with hex nuts, **ASTM A 563 (ASTM A 563M)**; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, **ASTM A 563 (ASTM A 563M)**; and, where indicated, flat washers.
- D. Machine Screws: **ASME B18.6.3 (ASME B18.6.7M)**.
- E. Lag Screws: **ASME B18.2.1 (ASME B18.2.3.8M)**.
- F. Plain Washers: Round, **ASME B18.22.1 (ASME B18.22M)**.
- G. Lock Washers: Helical, spring type, **ASME B18.21.1 (ASME B18.21.2M)**.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group **1 (A1)** stainless-steel bolts, **ASTM F 593 (ASTM F 738M)**, and nuts, **ASTM F 594 (ASTM F 836M)**.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with paints specified to be used over it and with a total VOC of less than 100 g/l.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa) unless otherwise indicated.
- G. Welded Wire Fabric: ASTM A 185/A 185M, 6 by 6 inches (152 by 152 mm), W1.4 by W1.4, unless otherwise indicated.
- H. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches (50 by 50 mm) by 0.062-inch- (1.6-mm-) diameter wire; comply with ASTM A 185/A 185M and ASTM A 82/A 82M, except for minimum wire size.

2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.

- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.
- H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.6 STEEL-FRAMED STAIRS

- A. Extending existing stairs: To the greatest extent possible, match existing metal stair materials and fabrication.
- B. Stair Framing:
 - 1. Fabricate stringers of steel plates or channels or tubes, as indicated.
 - a. Provide closures for exposed ends of channel and tube stringers.
 - 2. Construct platforms of steel plate, channel or tube headers and miscellaneous framing members as indicated.
 - 3. Weld stringers to headers; weld framing members to stringers and headers.
 - 4. Where stairs are enclosed by gypsum board, provide hanger rods or struts to support landings from floor construction above or below. Locate hanger rods and struts where they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.
 - 5. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.
- C. Metal-Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than **0.067 inch (1.7 mm)**.
 - 1. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.
 - 2. Shape metal pans to include nosing integral with riser.
 - 3. At Contractor's option, provide stair assemblies with metal-pan subtreads filled with reinforced concrete during fabrication.
 - 4. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.
 - a. Smooth Soffit Construction: Construct exposed subplatforms with flat metal under surfaces to produce smooth soffits.

2.7 STAIR RAILINGS

- A. Comply with applicable requirements in Division 05 Section "Pipe and Tube Railings."

2.8 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal stairs after assembly.
- C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

- D. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to plates cast into concrete unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.
- G. Place and finish concrete fill for treads and platforms to comply with Division 03 Section "Cast-in-Place Concrete."

3.2 INSTALLING RAILINGS

- A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
 - 1. Anchor posts to steel by welding directly to steel supporting members.
- B. Attach handrails to wall with wall brackets. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt. Provide bracket with **1-1/2-inch (38-mm)** clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as required to comply with performance requirements, as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.

3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
4. For steel-framed partitions, use hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.
5. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.
6. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.3 PHOTOLUMINESCENT EXIT PATH MARKINGS

- A. See Section 10 44 45 Photoluminescent Exit Path Markings. Coordinate installation in accordance with Manufacturer's instructions.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum **2.0-mil (0.05-mm)** dry film thickness.

END OF SECTION

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SECTION 05 51 19

METAL GRATING STAIRS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes industrial-type, stairs and landings with steel-grating treads and landings, and railings attached to metal grating stairs.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 05 Section "Metal Pan Stairs."
 - 4. Division 05 Section "Pipe and Tube Railings" for lighted railings, and for pipe and tube railings.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- A. Product Data: For metal grating stairs and the following:
 - 1. Paint products.
 - 2. Grout.

- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.

1.4 INFORMATIONAL SUBMITTALS

- A. Delegated-Design Submittal: For metal stairs to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Calculations: Submit design calculations prepared and sealed by a State of Maine licensed professional engineer. Design stairs, landings, railings, their support framing, fasteners and anchors in accordance with the performance requirements and loading criteria specified herein, code and other requirements. Submit calculations for the following:
 - a. Straight runs.
 - b. Platforms and landings.
 - c. Anchorage.
 - d. Handrails and guardrails
- B. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, licensed to practice in the State of Maine," to design stairs and railings.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Snow Loads: As indicated on Drawings.
 - 3. Uniform Load: 4.79 kN/sq. m (100 lbf/sq. ft.).
 - 4. Concentrated Load: 1.33 kN (300 lbf) applied on an area of 2580 sq. mm (4 sq. in.).
 - 5. Uniform and concentrated loads need not be assumed to act concurrently.
 - 6. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 - 7. Limit deflection of treads, platforms, and framing members to L/360.
- C. Seismic Performance of Stairs: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. Component Importance Factor: 1.25.
- D. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

- E. Steel Bars for Grating Treads: ASTM A 36/A 36M or steel strip, ASTM A 1011/A 1011M or ASTM A 1018/A 1018M.
- F. Wire Rod for Grating Crossbars: ASTM A 510M (ASTM A 510).
- G. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- H. Cast-Abrasive Nosings: Cast iron, with an integral abrasive, as-cast finish consisting of aluminum oxide, silicon carbide, or a combination of both.

2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941M (ASTM F 1941), Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM F 568M, Property Class 4.6 (ASTM A 307, Grade A); with hex nuts, ASTM A 563M (ASTM A 563); and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563M (ASTM A 563); and, where indicated, flat washers.
 - 1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts.
- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941M (ASTM F 1941), Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations, Loading Dock and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 738M (ASTM F 593), and nuts, ASTM F 836M (ASTM F 594).

2.4 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding unless otherwise indicated.

2. Use connections that maintain structural value of joined pieces.
- B. Form exposed work with accurate angles and surfaces and straight edges.
- C. Weld connections to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Weld exposed corners and seams continuously unless otherwise indicated.
 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 4 welds: good quality, uniform undressed weld with minimal splatter.
- D. Fabricate joints that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.6 STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," Industrial Class, unless more stringent requirements are indicated.
- B. Stair Framing:
 1. Fabricate stringers of steel plates or channels.
 - a. Provide closures for exposed ends of channel stringers.
 2. Construct platforms of steel plate or channel headers and miscellaneous framing members as needed to comply with performance requirements.
 3. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers.
- C. Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."
 1. Fabricate treads and platforms from welded steel grating with openings in gratings no more than 8 mm (5/16 inch) in least dimension.
 2. Surface: Plain.
 3. Finish at exterior: Galvanized.
 4. Fabricate grating treads with cast-abrasive nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.
 5. Fabricate grating platforms with nosing matching that on grating treads. Provide toeplates at open-sided edges of grating platforms. Weld grating to platform framing.
 6. Fabricate risers from rolled steel floor plate.

2.7 STAIR RAILINGS

- A. Comply with applicable requirements in Section 05 52 13 "Pipe and Tube Railings."
 1. Connect posts to stair framing by direct welding unless otherwise indicated.
 2. Provide lighted railings where indicated.

2.8 FINISHES

- A. Finish metal stairs after assembly.
- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
 - 2. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.

3.2 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 05 52 13

PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Steel pipe and tube railings.
 - 2. Stainless-steel pipe and tube railings.
 - 3. Preparation of railings for Illumination.
 - 4. Design calculations for the above.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 05 Section "Metal Stairs" for steel tube railings associated with metal stairs.
 - 4. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking for anchoring railings.
 - 5. Division 09 Section "Non-Structural Metal Framing" for metal backing for anchoring railings.
 - 6. Division 26 Sections for light fixtures for illuminated railings, lighting power and controls.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, licensed to practice in the State of Maine, using performance requirements and design criteria indicated.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Steel: 72 percent of minimum yield strength.
 2. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
 3. Stainless Steel: 60 percent of minimum yield strength.
- C. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
 - b. Infill load and other loads need not be assumed to act concurrently.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- F. Illuminated railing performance:
1. Walkway Illumination: 1 footcandle minimum.
 2. Stairway Illumination: 10 footcandles minimum, measured at the center of the tread surface and on landing surfaces within 24 inches of the step nosing.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Manufacturer's product lines of mechanically connected railings.
 2. Railing brackets.
 3. Grout, anchoring cement, and paint products.
- A. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership

- Extraction Practices. If available, for each product submit documentation of the following:
- 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
- d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
1. For illuminated railings, include wiring diagrams and roughing-in details.
 2. Provide shop drawings sealed and signed by the same State of Maine Licensed Professional Engineer that prepared calculations.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design.
- D. Samples for Verification: For each type of exposed finish required.
1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 2. Fittings and brackets.
 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - a. Show method of finishing and connecting members at intersections.

1.4 INFORMATIONAL SUBMITTALS

- A. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Calculations: Submit design calculations prepared and sealed by a State of Maine Licensed Professional Engineer. Design stairs, landings, railings, their support framing, fasteners and anchors in accordance with the performance requirement loading criteria specified herein, code and other requirements. Submit calculations for the following:
1. Handrails,
 2. Guardrails,
 3. Railings
 4. Anchors.
- C. Qualification Data: For qualified manufacturer/fabricator and professional engineer.
- D. Welding certificates.

- E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- B. Manufacturer Qualifications: Provide manufactured railings by a firm producing the types of railing systems required for not less than ten (10) consecutive years, with not less than five (5) similar projects that have been in successful use for not less than five (5) years.
- C. Installer Qualifications:
 - 1. Minimum five (5) consecutive years experience in the successful installation of railing systems of the type indicated for this project.
 - 2. The Installer is to be acceptable to the Manufacturer of the railing system and the Architect. The Manufacturer is to provide written assurance to the Architect of the installer acceptability upon request.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- E. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."
- F. Mockups: Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 600 mm (24 inches) in length.
 - 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.
- D. Coordinate electrical power requirements for illuminated railings with Electrical Work.

PART 2 - PRODUCTS

2.1 GENERAL

A. LEED Performance Requirements

1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.3 STEEL AND IRON

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 60 percent.
- B. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- C. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 1. Provide galvanized finish for exterior installations and where indicated.
- D. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- E. Woven-Wire Mesh: Match existing square pattern, and wire size, woven-wire mesh, made from wire complying with **ASTM A 510** (**ASTM A 510M**).
- F. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.4 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 304.
- B. Pipe: ASTM A 312/A 312M, Grade TP 304.
- C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
- D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
- E. Bars and Shapes: ASTM A 276, Type 304.

2.5 STAINLESS-STEEL HANDRAIL BRACKETS

- A. Glass-mount Stainless-steel Bracket Manufacturer: Subject to compliance with the requirements, provide the following:

1. JRE Hardware Inc.; "Glass Wall Mount Handrail Bracket and "Regular Wall Mount Handrail Bracket.

B. Description:

1. Handrail Bracket,
2. Stainless-steel Type 304.
3. Glass Mount, Wall mount
4. For 1/2-inch thick glass,
5. Vary arm lengths to align railings mounted on glass and on gypsum board walls.
6. Round Saddle,
7. #4 Satin Finish.

2.6 HANDRAIL BRACKETS

- A. Manufacturer: Subject to compliance with the requirements, provide one of the following:

1. Wagner.
2. JRE Hardware Inc.

- B. Fabricate from standard components:

1. Wagner Stamped Steel Handrail Bracket Saddle for 1.50" to 2" Diameter handrail. 2-1/2" Long X 1" Wide X 12 Gauge With Two 1/4" Holes and one 3/8" Center Hole. Plain, unfinished. Item #: S101
2. Wagner Steel 90 Degree Bar Bend, 5/8". Diameter. Unfinished. Item #: R140
3. Wall attachments with concealed fasteners, suitable for wall conditions encountered.

2.7 WALL (PARAPET) MOUNT GUARDRAIL

- A. Manufacturer: Subject to compliance with the requirements, wall mount guardrail manufacturers include but are not limited to the following:

1. Leading Edge Safety.

- B. Standards: Meets and exceeds OSHA standard CFR 29 1910.501, 29 1910.502, 20.1910.23 CAL-OSHA §1620,, CAL-OSHA §1621, CAL-OSHA §3209, CAL-OSHA §3210, ANSI/ASSE A1264.1-2007, USACE EM 385-1-1 (21.E.01 a-c)

- C. Applications: The Wall Mount Guardrail provides perimeter fall protection for low-slope roofs requiring attachment to the inside of parapet walls.

- D. Materials:

1. Uprights: 1.25" schedule 40 steel pipe (ASTM A53) - 1.66" O.D. x .140" wall
2. Mounting Bracket: 3/16" steel plate (ASTM A36) bracket with pre-punched holes for mounting stud attachment.
3. Horizontal Rails 1.625" x .065" and 1.375" x .065" (ASTM C1008/1010) steel tube adjustable slide rails.
4. Hardware 3/8"-16 x 1" zinc plated fasteners.
5. Sizes Uprights Custom designed to OSHA standards
6. Horizontal Rails 8'-0 o.c.; 120" to 170", 70" to 43" 43" to 29" adjustable
7. Corners 20.5" o.c. outside corner; 12.5" o.c. inside corner

- E. Finish: Hot dip galvanized, after fabrication.

2.8 FASTENERS

- A. General: Provide the following:
 - 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5 for zinc coating.
 - 2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
 - 3. Stainless-Steel Components: Type 304 stainless-steel fasteners.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 - 2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
 - 3. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group **1 (A1)** stainless-steel bolts, **ASTM F 593 (ASTM F 738M)**, and nuts, **ASTM F 594 (ASTM F 836M)**.

2.9 MISCELLANEOUS MATERIALS

- A. Electrical Components: Provide internal, LED light fixtures and electrical components, required as part of illuminated railings, that comply with NFPA 70, are listed and labeled by a qualified testing agency as defined in NFPA 70, and are marked for intended location and application.
- B. Flanges for flange attached, removable railings: Kee Klamp pipe fitting; Type 62 Standard Railing Flange.
- C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- D. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 compatible with paints specified to be used over it.
- F. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- G. Shop Primer for Galvanized Steel: Water based galvanized metal primer complying with MPI#134.
- H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.10 FABRICATION

- A. Extending Existing Stairs: To the greatest extent possible, match existing pipe and tube railings materials and fabrication
- B. Parking Railings: To the greatest extent possible, match existing steel parking railings materials and fabrication.
- C. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- D. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- E. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- F. Form work true to line and level with accurate angles and surfaces.
- G. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- I. Connections: Fabricate railings with welded connections unless otherwise indicated.
- J. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.
 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- K. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

- L. Form changes in direction as follows:
 - 1. By inserting prefabricated elbow fittings.
 - M. Close exposed ends of railing members with prefabricated end fittings.
 - N. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is **1/4 inch (6 mm)** or less.
 - O. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
 - P. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
 - Q. For railing posts set in concrete, provide stainless-steel sleeves not less than **6 inches (150 mm)** long with inside dimensions not less than **1/2 inch (13 mm)** greater than outside dimensions of post, with metal plate forming bottom closure.
 - R. Railing support posts: For rooftop railings, provide flanged supports anchored to structure.
 - S. For removable railing posts, fabricate slip-fit sockets from stainless-steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
 - 1. Provide chain with eye, snap hook and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same material as railings.
 - T. For removable railing posts, where indicated, install into railing flanges anchored to concrete floor.
 - 1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.
 - U. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.
 - V. Illuminated railings: Prepare illuminated railings for LED Light fixtures.
 - 1. See Division 26 Section "Lighting" for LED railing fixtures.
- 2.11 FINISHES, GENERAL
- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products"
 - B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in

appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

- C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- D. Galvanize exterior railings.
- E. Prime interior railings for field painting.

2.12 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: ASTM A 480/A 480M, No. 4.

2.13 STEEL AND IRON FINISHES

- A. Galvanized railings:
 - 1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
 - 2. Hot-dip galvanize indicated steel and iron railings, including hardware, after fabrication.
 - 3. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
 - 4. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
 - 5. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
 - 6. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.
- E. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- F. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Shop prime uncoated railings with universal shop primer unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 2. Set posts plumb within a tolerance of **1/16 inch in 3 feet (2 mm in 1 m)**.
 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet (5 mm in 3 m)**.
- C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.
- F. Coordination: Coordinate installation of illuminated railing light fixtures and wiring with Electrical Work.

3.3 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending **2 inches (50 mm)** beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within **6 inches (150 mm)** of post.

3.4 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve

with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

- B. Anchor posts to concrete: Clean sleeves of loose material, insert posts, and fill annular space between post and sleeves with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
 - 1. Leave anchorage joint exposed with 1/8-inch (3-mm) buildup, sloped away from post.
- C. Anchor posts to metal surfaces by welding as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For steel pipe railings, fix flanges to post with set screws, and bolt to metal supporting surfaces.
 - 2. For steel pipe railings, fix flanges to post with set screws, and anchor to concrete supporting surfaces, with post-installed anchors.
- D. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.
- E. Anchoring parking railings: Anchor to precast concrete spandrels to match existing construction.

3.5 ATTACHING RAILINGS

- A. Attach railings to wall with wall brackets. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 - 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- B. Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.
 - 3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
 - 4. For steel-framed partitions, use hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.
 - 5. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.6 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION

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SECTION 05 52 13

FABRICATED METAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Safety netting for rooftop Helistops
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification..
- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 07 62 00 "Sheet Metal Flashing And Trim" for gutters and downspouts supported by safety netting system.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Mechanical railings connections.
 - 2. Railing brackets.
 - 3. Anchors.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.

- b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- C. Shop Drawings: Show fabrication and installation details for metal fabrications.
- 1. Include plans, elevations, sections, and details of metal fabrications, safety netting and their connections. Show anchorage and accessory items.
 - 2. Shop drawings for work requiring delegated design submittal are to be prepared, and sealed or certified by the qualified professional engineer responsible for their preparation.
- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed or certified by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified professional engineer.
- B. Welding certificates.
- C. Certification: Submit statement certified by the registered structural engineer that the design of the structural components of the Helistop is in compliance with provisions of the Contract Documents and the Local Building Codes, and is in keeping with generally accepted engineering practice.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a 5 year record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Structural Engineer Qualifications: The helistop safety netting shall be designed by a registered structural engineer, in accordance with the local building codes, and said engineer shall be employed by the Helistop manufacturer, and licensed to practice in the Jurisdiction of the Project.

- C. Qualifications for Welding Work:
 - 1. Qualify welding processes and welding operators in accordance with the AWS, Standard Qualification Procedure.
 - 2. Provide certification that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous twelve (12) months. Provide recertification of welders as required.
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 COORDINATION

- A. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Field Measurements: Verify actual locations of other construction contiguous with safety netting by field measurements before fabrication.
- C. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating safety netting without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 - 1. Provide allowance for trimming and fitting at site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with the Requirements, acceptable manufacturers include but are not limited to the following:
 - 1. FEC Heliports, a division of Federal Equipment Company.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Safety netting, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Loads as indicated on the Drawings.
 - 2. Provide safety netting to accommodate a concentrated load of 250 pounds applied over any one square foot of safety netting or 25 psf live load.
 - 3. Deflection: Limit safety net support structure to L/180.

2.3 METALS, GENERAL

- A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.4 STEEL AND IRON

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- C. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 - 1. Provide galvanized finish for exterior installations and where indicated.
- D. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- E. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- F. Woven-Wire Mesh: Intermediate-crimp, diamond pattern, 1 1/4-inch woven-wire mesh, made from 0.1483-inch diameter wire complying with ASTM A 510 (ASTM A 510M).

2.5 FASTENERS

- A. General: Provide the following:
 - 1. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.

2.6 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.7 FABRICATION

- A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Form work true to line and level with accurate angles and surfaces.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.
- D. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- E. Brackets, Flanges, Fittings, and Anchors: Provide brackets, flanges, miscellaneous fittings, and anchors to interconnect members to other work unless otherwise indicated.
- F. Woven-Wire Mesh: Fabricate infill panels from woven-wire mesh. Anchor to framework on all sides.
- G. Tension Bars: Steel, length not less than 2 inches (50 mm) shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- H. Tension and Brace Bands: Pressed steel.
- I. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
1. Hot-Dip Galvanized Steel.
- 2.8 STEEL AND IRON FINISHES
- A. Galvanized Railings:
1. Hot-dip galvanize safety netting supporting structure, including hardware, after fabrication.
 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
 3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
 4. Comply with ASTM A392 for hot-dip galvanized steel chain-link fence fabric.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine and verify that receiving substrate surfaces of the structure have no defects or errors which would result in poor or potentially defective application or cause latent defects in workmanship.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Substrate Adequacy: Prepare the structure to insure proper and adequate structural support of the materials specified.

- B. Substrate Surface: Prepare substrate surfaces to insure proper and adequate installation, in accordance with the Contract Documents, approved Shop Drawings and manufacturer's requirement.
- C. Cover and protect other work subject to damage from fallout of materials during installation.

3.3 INSTALLATION, GENERAL

- A. Set safety netting accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

3.4 ERECTION

- A. Erect safety netting in accordance with manufacturer's latest published requirements, instructions, specifications, details, and approved Shop Drawings.
- B. Safety netting manufacturer shall coordinate requirements for on-site support required for erection of items supplied, and is responsible for supplying and delivering to the site components required for complete and usable installation whether or not shown or specified by these documents.

3.5 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 05 75 00

DECORATIVE FORMED METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded aluminum base.
2. Stainless steel base.
3. Stainless-steel trim for woodwork and paneling.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 COORDINATION

- ###### A.
- Coordinate installation of anchorages for decorative metal items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 PREINSTALLATION MEETINGS

- ###### A.
- Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- ###### A.
- Product Data: For each type of product, including finishing materials.

- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Show fabrication and installation details for decorative metal.
1. Include plans, showing locations of installation, elevations, component details, and attachment details.
 2. Indicate materials and profiles of each decorative metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.
- D. Samples for Initial Selection: For products involving selection of color, texture, or design including mechanical finishes.
- E. Samples for Verification: For each type of exposed finish.
1. Sections of linear shapes.
 2. Full-size Samples of castings and forgings.
 - a. For custom castings, submit finished Samples showing ability to reproduce detail, cast-metal color, and quality of finish. Samples may be of similar previous work.
 3. Samples of welded and brazed joints showing quality of workmanship and color matching of materials.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, licensed to practice within the State of Maine, responsible for their preparation.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing decorative metal similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Installer Qualifications: Fabricator of products.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups for each type of decorative metal.
 - a. .
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store decorative metal in a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.
- B. Deliver and store cast-metal products in wooden crates surrounded by enough packing material to ensure that products are not cracked or otherwise damaged.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with decorative metal by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design, items scheduled including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
 - 1. Design Calculations: Submit for each item.

- B. Structural Performance: Provide metal fabrications and connections capable of withstanding the following design loads within limits and under conditions indicated:
 - 1. Loads: As indicated on the Drawings.
 - 2. Seismic loads: As indicated on the Drawings.
- C. Deflection: Design for maximum deflection of L/180.

2.2 EXTRUDED ALUMINUM BASE

- A. Product: Schluter; -DESIGNBASE-SL
 - 1. Description: Anodized Aluminum Baseboard profile comprised of a symmetrically rounded top, flat exposed face, and 5/16 inch (8 mm) radius lower section.
 - 2. Corners:
 - a. Provide with matching inside corners.
 - b. Provide with matching outside corners.
 - c. Provide with matching connectors.
 - d. Provide with matching end caps.
 - e. Provide with matching Sealing Lip.
 - 3. Material and Finish:
 - a. a. AE - Satin Anodized Aluminum.
 - 4. Height:
 - a. As indicated on the Drawings.

2.3 STAINLESS-STEEL BASE [**SSB-01**]

- A. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness.
 - 1. Thickness: 0.050 inches.
 - 2. Height: 6 inches, unless otherwise indicated.
 - 3. Core: Particle Board or MDF, See Section 06 42 16 Flush Wood Paneling for requirements.
 - 4. Finish: #4 directional polish.

2.4 STAINLESS-STEEL TRIM

- A. Bars and Shapes: ASTM A 276, Type 304, fabricate to shapes indicated..
 - 1. Finish: #4 directional polish.

2.5 METALS, GENERAL

- A. Metal Surfaces, General: Use materials with smooth, flat surfaces unless otherwise indicated. Use materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

2.6 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 304.
- B. Pipe: ASTM A 312/A 312M, Grade TP 304.

- C. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
- D. Bars and Shapes: ASTM A 276, Type 304.

2.7 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Stainless-steel: Type 304 stainless-steel fasteners.
 - 2. Dissimilar Metals: Type 304 stainless-steel fasteners.
- B. Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.
- C. Provide concealed fasteners for interconnecting components and for attaching decorative metal items to other work unless exposed fasteners are unavoidable.
 - 1. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

2.8 MISCELLANEOUS MATERIALS

- A. Welding Rods: Provide type and alloy as recommended by producer of metal in fabricated items.
- B. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.9 FABRICATION, GENERAL

- A. Assemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- B. Cast decorative metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
- C. Form decorative metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
- D. Form simple and compound curves in bars, pipe, tubing, and extruded shapes by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.
- E. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

- F. Mill joints to a tight, hairline fit. Cope or miter corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.
- G. Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as needed to receive finish hardware, screws, and similar items unless otherwise indicated.
- H. Comply with AWS for recommended practices in shop welding. Weld behind finished surfaces without distorting or discoloring exposed side.

2.10 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

2.12 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative metal.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Provide anchorage devices and fasteners where needed to secure decorative metal to in-place construction.
- B. Perform cutting, drilling, and fitting required to install decorative metal. Set products accurately in location, alignment, and elevation, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items to be built into concrete, masonry, or similar construction.
- C. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing of decorative metal, restore finishes to eliminate evidence of such corrective work.
- D. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.

3.3 CLEANING AND PROTECTION

- A. Unless otherwise indicated, clean metals by washing thoroughly with clean water and soap, rinsing with clean water, and drying with soft cloths.
- B. Protect finishes of decorative metal from damage during construction period with temporary protective coverings approved by decorative metal fabricator. Remove protective covering at time of Substantial Completion.
- C. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

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SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Wood blocking and nailers.
 2. Wood furring.
 3. Wood sleepers.
 4. Plywood backing panels.
- B. Sustainable Building Requirements:
1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 2. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 3. Section 06 16 00 "Sheathing" for sheathing, subflooring, and underlayment.
 4. Section 07 72 00 "Roof Accessories" for roof curbs.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than **2 inches nominal (38 mm actual)** size in least dimension.
- B. Dimension Lumber: Lumber of **2 inches nominal (38 mm actual)** or greater size but less than **5 inches nominal (114 mm actual)** size in least dimension.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.

- 3) Flooring Products.
- 4) Composite Wood Products.
- 5) Ceilings, Walls, Thermal and Acoustical Insulation products.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
1. Preservative-treated wood.
 2. Fire-retardant-treated wood.
 3. Power-driven fasteners.
 4. Post-installed anchors.
 5. Metal framing anchors.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
- B. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- D. Mockups: Provide metal fabrications for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
1. Mockups: See Section 01 43 39 "Room Mockup requirements" for room mockups requiring rough carpentry.
 2. Mockups: See Section 01 45 34 "Mockups for Exterior Wall Systems." for mockups requiring rough carpentry.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Certified Wood: Lumber and plywood shall be certified as "FSC Pure" according to FSC STD-01-001 and FSC STD-40-004.
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 3. Dress lumber, S4S, unless otherwise indicated.
- C. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2[for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground].
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- D. Application: Treat items indicated on Drawings, and the following:
1. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
 2. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 3. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
 4. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
1. Concealed blocking.
 2. Plywood backing panels.
- 2.4 DIMENSION LUMBER FRAMING
- A. Framing: Construction or No. 2 grade of any species:
- 2.5 MISCELLANEOUS LUMBER
- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
 2. Nailers.
 3. Rooftop equipment bases and support curbs.
 4. Cants.
 5. Furring.
 6. Grounds.
 7. Utility shelving.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.
- C. Concealed Boards: 15 percent maximum moisture content of any of the following species and grades:
1. Eastern softwoods, No. 2 Common grade; NELMA.
 2. Northern species, No. 2 Common grade; NLGA.

- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than **3/4-inch (19-mm)** nominal thickness.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Screws for Fastening to Metal Framing: ASTM C 1002 or ASTM C 954, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with **ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4)**.

2.8 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
 - 1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using

- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than **0.025 inch (0.6 mm)**.
 - 1. Flexible Flashing shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than **16 inches (406 mm)** o.c.
- G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than **96 inches (2438 mm)** o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than **96 inches (2438 mm)** o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and **2-inch nominal (38-mm actual)** thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than **100 sq. ft. (9.3 sq. m)** and to solidly fill space below partitions.
 - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than **20 feet (6 m)** o.c.

- H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- I. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.
- L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than **1-1/2 inches (38 mm)** wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Gypsum Board: Install **1-by-2-inch nominal- (19-by-38-mm actual-)** size furring vertically at **16 inches (406 mm)** o.c.

3.4 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

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SECTION 06 16 00

SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Parapet sheathing.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
 - 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 4. Section 06 10 53 "Miscellaneous Rough Carpentry" for plywood backing panels.
 - 5. Section 07 27 20 "Air Barriers" for water-resistive barrier applied over wall sheathing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.

3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
 4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
1. Wood-preserved-treated plywood.
 2. Fire-retardant-treated plywood.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
- B. Manufacturer Qualifications for wood sheathing: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- C. Vendor Qualifications for wood sheathing: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- D. Mockups: Provide sheathing for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
- E. Mockups: See Section 01 45 34 "Mockups" for mockups requiring sheathing.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- B. LEED Requirements:
 - 1. Provide gypsum sheathing products with available third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
 - 2. Provide gypsum sheathing products with available manufacturer's product-specific Health Product Declarations (HPDs).
 - 3. Provide gypsum sheathing products with available Greenguard Gold Certification.

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Certified Wood: The following wood products shall be certified as "FSC Pure" according to FSC STD-01-001 and FSC STD-40-004.

1. Plywood.

- C. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- D. Factory mark panels to indicate compliance with applicable standard.

2.3 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified. For sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to **170 deg F (76 deg C)** shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat all plywood sheathing unless otherwise indicated.

2.4 WALL AND PARAPET SHEATHING

- A. Plywood Sheathing: Exterior, Structural I sheathing.
 - 1. Nominal Thickness: As indicated, but not less than **1/2 inch (13 mm)**.
 - 2. Fire-retardant treated.

- B. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. Temple-Inland Building Products by Georgia-Pacific.
 2. Type and Thickness:
 - a. Regular, **1/2 inch (13 mm)** thick.
 - b. Where indicated or required for fire-resistance, or for Perimeter fire restive joint system, Type X, **5/8 inch (15.9 mm)** thick.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. For parapet and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 2. For parapet and wall sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
1. For steel framing less than **0.0329 inch (0.835 mm)** thick, use screws that comply with ASTM C 1002.
 2. For steel framing from **0.033 to 0.112 inch (0.84 to 2.84 mm)** thick, use screws that comply with ASTM C 954.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.
- D. Coordinate wall and parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall and Parapet Sheathing:
 - a. Screw to cold-formed metal framing.
 - b. Space panels **1/8 inch (3 mm)** apart at edges and ends.
 - 2. Install panels with a **3/8-inch (9.5-mm)** gap where non-load-bearing construction abuts structural elements.
 - 3. Install panels with a **1/4-inch (6.4-mm)** gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

3.3 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install panels with a **3/8-inch (9.5-mm)** gap where non-load-bearing construction abuts structural elements.
 - 3. Install panels with a **1/4-inch (6.4-mm)** gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

- C. Horizontal Installation: Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.

- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.

END OF SECTION

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SECTION 06 41 13

WOOD-VENEER-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood-veneer-faced architectural cabinets.
2. Wood Screen.
3. Wood furring, blocking, shims, and hanging strips for installing architectural cabinets that are not concealed within other construction.
4. Shop finishing of architectural cabinets.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
4. Section 12 36 23 "Plastic Laminated-Clad Countertops"
5. Section 12 36 61 "Simulated Stone Countertops"

1.2 COORDINATION

- ###### A.
- Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.3 PREINSTALLATION MEETINGS

- ###### A.
- Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.

- C. Shop Drawings: For architectural cabinets.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for items installed in architectural cabinets.
 - 5. Apply AWI Quality Certification Program label to Shop Drawings.

- D. Samples: For each exposed product and for each color and finish specified, in manufacturer's or fabricator's standard size.
- E. Samples for Verification: For the following:
 - 1. Lumber for Transparent Finish: Not less than 5 inches (125 mm) wide by 12 inches (300 mm) long, for each species and cut, finished on one side and one edge.
 - 2. Prefinished panels: Representative of and selected from panels to be used for transparent-finished cabinets.
 - 3. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For each type of product.
 - 1. Prefinished veneered panels.
 - 2. Composite wood products.
 - 3. Thermoset decorative panels.
 - 4. Glass.
 - 5. Adhesives.
- C. Quality Standard Compliance Certificates: AWI Quality Certification Program.
- D. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Shop Certification: AWI's Quality Certification Program accredited participant.
 - 2. Shop is certified for chain of custody by an FSC-accredited certification body.
- B. Installer Qualifications: Fabricator of products.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of typical architectural cabinets as shown on Drawings, if not shown, mock up one cabinet of each Type, including countertops.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.9 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that wood-veneer-faced architectural cabinets can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 CABINETS, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
 - 2. The Contract Documents contain requirements that are more stringent than the referenced woodwork quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
 - 3. Grade: Premium.
- B. LEED Performance Requirements:
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide interior architectural wood cabinet products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

3. Provide composite wood products that meet Composite Wood Evaluation requirements, as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
4. LEED Requirements: Provide wood fiberboard and particle board products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

2.2 WOOD CABINETS FOR TRANSPARENT FINISH

- A. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- B. Type of Construction: Frameless.
- C. Door and Drawer-Front Style: Flush overlay.
- D. Wood for Exposed Surfaces:
 1. Prefinished veneered panels: As indicated in the materials legend, on the drawings.
 2. Grain Direction: Vertically for drawer fronts, doors, and fixed panels, unless otherwise indicated.
- E. Semi-exposed Surfaces Other Than Drawer Bodies: Thermoset decorative panel.
 - a. Color: As selected by the Architect from Manufacturer's full range.
 2. Drawer Subfronts, Backs, and Sides: Solid-hardwood lumber.
 3. Drawer Bottoms: Thermoset decorative panel.
 4. Edge Banding:
 - a. Wood edge band:
 - 1) Doors.
 - 2) Drawer fronts.
 - 3) Cabinet body face.
 - b. Polyester edge band:
 - 1) Thermoset decorative panel shelves.
- F. Dust Panels: 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- G. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

2.3 WOOD SCREEN

- A. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- B. Wood for Exposed Surfaces:
 1. Species: as indicated in the materials legend, on the drawings.
 2. Cut: Rift sawn unless otherwise indicated.

2.4 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than **3 inches (75 mm)** wide.
 2. Wood Moisture Content: 8 to 13 percent.
- B. Composite Wood: Provide materials that comply with requirements of referenced quality standard for each type of ornamental woodwork and quality grade specified unless otherwise indicated. Meet requirement for recycled content or for certified wood:
1. Recycled Content of MDF and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 100 percent.
 2. Certified Wood: MDF and Particleboard products, certified as "FSC Pure" according to FSC STD-01-001 and FSC STD-40-004.
 3. Basis of Design Manufacturer: Subject to compliance with the requirements, provide products by Sierra Pine, (Roseberg) or comparable products by another Manufacturer acceptable to the Architect.
 4. Thermoset Decorative Panels: Particleboard with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
- C. Composite Wood Products: Products, made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
1. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
- D. Edgebanding for Wood-Veneered Construction: Where edgebanding is indicated, apply Minimum **1/8-inch- (3-mm-)** thick, solid wood of same species as face veneer.
1. Select wood edgebanding for grain and color compatible with face veneers.
 2. Finish edgebanding to match panels.

2.5 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of the burners at any time during the test.
1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
 2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
 3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
 4. Mill lumber before treatment and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of architectural cabinets.

2.6 CABINET HARDWARE AND ACCESSORIES

- A. Hardware Standard: Comply with BHMA A156.9 "American National Standard for Cabinet Hardware" for items specified or shown by reference to BHMA numbers or referenced to this standard. BHMA numbers are used below to designate hardware requirements. Provide the following architectural hardware, except where other items are indicated on drawings.
- B. Catches: Magnetic catches, BHMA A156.9, B03141 Roller catches, BHMA A156.9, B03071.
- C. Drawer Slides: BHMA A156.9.
1. Grade 1: Side mounted.
 - a. Type: Full extension.
 - b. Material: Zinc-plated or Epoxy-coated steel with polymer rollers.
 2. Box Drawer Slides: Grade 1HD-100. "Model No. 7432" (Accuride) up to 100 lbs.; full extension, progressive movement, rail mounted.
 3. File Drawer Slides: Grade 1HD-200. "Model No. 4034 (Accuride) up to 150 lbs and max. 30 in. drawer width; and "Model No. 3640 (Accuride) up to 200 lbs and drawer width 30 in. and up.
 4. Pencil Drawer Slides: Grade 1. "Model No.2632" (Accuride) up to 65 lbs., full extension, rail mount, for shallow drawers up to 3 in. deep.
 5. For trash bins not more than **20 inches (500 mm)** high and **16 inches (400 mm)** wide, provide Grade 1HD-200.
- D. Slides for Sliding Glass Doors: BHMA A156.9, B07063; plastic.
- E. Frameless Concealed (European Type) Hinges: BHMA B01602. Provide "3903 Snap-On 3000 Concealed Hinges" (Grass); self-closing.
- F. Self-Closing Spring Loaded Mortise Hinges: Steel with chrome finish: "8401" (McMaster Catalog); sized for size and weight of door panel.
- G. Pulls: Doug Mockett DP 128, Stainless steel.

- H. Locks: Provide locks appropriate to purpose intended as manufactured by Dom or Timberline unless otherwise shown or specified.
 - 1. Door Locks: BHMA E07121; stainless steel with brushed finish.
 - 2. Drawer Locks: BHMA E07041 stainless steel with brushed finish.

- I. Pushbutton Cabinet Lock: Lockey Door and Gate Security Hardware; Lockey C-170 Pushbutton Cabinet Lock.
 - 1. Surface Mount Cam Lock for Cabinet Doors
 - 2. Easy to Change Code
 - 3. Compatible with Thin Door Kit (TDK) for Applications 1/4" - 1" Thick
 - 4. Dimensions: 5" (H) x 1-3/16" (W)
 - 5. Finish: Dull Chrome.

- J. Flush bolts: "No. 40, Concealed Screw Surface Bolt" (H. B. Ives), or approved equal, 6 in. long, furnished with top and bottom mortised strike plates.

- K. Cabinet Shelf Supports (pin-type for cabinets with holes in sides): BHMA B04013. "No. 282.11.761" (Hafele) or approved equal, for use with predrilled holes in sides of cabinet for medium duty application.

- L. Hang Rods: Provide where shown, including accessories.
 - 1. Tubing: 1-5/16 in. outside diameter. Stainless steel with brushed finish; "No. B-3395" (Garcy Corp.).
 - 2. End Flanges: To suit diameter of tubing; "No. B-3369" (Garcy Corp.). Stainless steel with brushed finish.

- M. Door and Drawer Silencers: BHMA A156.16, L03011.

- N. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, 6 mm thick unless otherwise indicated.
 - 1. Unframed Glass Doors: Seam exposed edges seamed before tempering.

- O. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.

- P. Concealed countertop and fixed shelf support brackets:
 - 1. Rangine Corporation; Rakks, Countertop brackets. EH-Inside Wall Mount series, size for countertop or shelf depth. Clear anodized finish. For use at Metal Framed partitions.
 - 2. Faceplates: Provide EH-FR-22, or-23 aluminum faceplates with adhesive backing and notched to fit around vertical flange of flush mounted counter support bracket and conceal penetration through gypsum board providing neat, finished appearance.

- Q. Exposed countertop and fixed shelf support brackets:
 - 1. Rangine Corporation; Rakks, Countertop brackets. Exposed mount, EH-Surface Mount Series, size for countertop or shelf depth. Clear anodized finish. For use at Metal Framed partitions.

- R. Grommets for Cable Passage through Countertops: 2-inch OD, plated steel grommets and matching caps with slot for wire passage of color matching color of adjacent work surfaces.

1. Product: Subject to compliance with requirements, provide "PS series" by Doug Mockett & Company, Inc.
 2. Color: As selected by the Architect.
- S. Wire Management Tray: # 829.15.302 by Hafale with black finish.
- T. Levelers: Heavy duty steel channel type.
- U. Work Surface Legs: "TL27" (Doug Mockett); with satin chrome finish; 4 inch diameter work surface leg, x height required for use, with plate leveler.
- V. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 2. Satin Stainless Steel: BHMA 630.
- W. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.7 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.8 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate architectural cabinets to dimensions, profiles, and details indicated. Ease edges and corners to **1/16-inch (1.5-mm)** radius unless otherwise indicated.
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as

intended and check measurements of assemblies against field measurements before disassembling for shipment.

- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- E. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual."
 - 1. For glass in wood frames, secure glass with removable stops.
 - 2. For exposed glass edges, polish and grind smooth.

2.9 SHOP FINISHING

- A. General: Finish architectural cabinets at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
- B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural cabinets, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of cabinets.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: System - 11, catalyzed polyurethane.
 - 3. Wash Coat for Closed-Grain Woods: Apply wash-coat sealer to cabinets made from closed-grain wood before staining and finishing.
 - 4. Staining: Match Architect's sample.
 - 5. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
 - 6. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing

nails or finishing screws for exposed fastening, countersunk and filled flush with cabinet surface.

1. For shop-finished items, use filler matching finish of items being installed.

D. Install cabinets level, plumb, and true in line to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)** using concealed shims.

1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

3. Maintain veneer sequence matching of cabinets with transparent finish.

4. Fasten wall cabinets through back, near top and bottom, and at ends not more than **16 inches (400 mm)** o.c..

E. Shop Finishes: Touch up finishing after installation of architectural cabinets. Fill nail holes with matching filler.

1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces. Touch up finishes to restore damaged or soiled areas.

END OF SECTION

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SECTION 06 41 16

PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Solid-surfacing-clad architectural cabinets.
3. Quartz-agglomerate-clad architectural cabinets.
4. Solid-surfacing-clad benches.
5. Solid-surfacing-clad bumper guard/handrail.
6. Decorative resin panels.
7. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
5. Section 12 36 23.13 "Plastic-Laminate-Clad Countertops."
6. Section 12 36 61 "Simulated Stone Countertops."

1.2 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.

- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
 - 5. Apply AWI Quality Certification Program label to Shop Drawings.
- D. Samples: For each exposed product and for each color and texture specified, in manufacturer's or fabricator's standard size.
- E. Samples for Verification: For the following:
 - 1. Plastic Laminates: **8 by 10 inches (200 by 250 mm)**, for each type, color, pattern, and surface finish required.
 - a. Provide one sample applied to core material with specified edge material applied to one edge.
 - 2. Corner Pieces:
 - a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, **18 inches (450 mm)** high by **18 inches (450 mm)** wide by **6 inches (150 mm)** deep.
 - b. Miter joints for standing trim.
 - 3. Solid-surfacing Material: **8 by 10 inches (200 by 250 mm)**, for each type, color, pattern, and surface finish required.
 - 4. Quartz-agglomerate: **8 by 10 inches (200 by 250 mm)**, for each type, color, pattern, and surface finish required.
 - 5. Decorative resin panels: **8 by 10 inches (200 by 250 mm)**, for each type, color, pattern, and surface finish required.
 - 6. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.
 - 7. Bumper handrail: 24 inch length, including wall bracket.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For the following:
 - 1. Composite wood products.
 - 2. High-pressure decorative laminate.
 - 3. Glass.
 - 4. Adhesives.
- C. Quality Standard Compliance Certificates: AWI Quality Certification Program.
- D. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Shop Certification: AWI's Quality Certification Program accredited participant.

2. Shop is certified for chain of custody by an FSC-accredited certification body.
- B. Installer Qualifications: Fabricator of products.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockups of typical architectural cabinet, bench and bumper handrail as shown on Drawings, if not shown, mock up one cabinet of each Type, including countertops.
 2. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring Plastic Laminate Cabinets.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. LEED Performance Requirements:
1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide interior architectural plastic laminate cabinet products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

3. Provide composite wood products that meet Composite Wood Evaluation requirements, as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
4. Provide, plastic laminate products, Solid-surfacing and quartz agglomerate products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
5. Provide wood fiber and particle board products, solid-surfacing and quartz agglomerate products with manufacturer's product-specific Health Product Declarations (HPDs).
6. Provide plastic laminate products with Greenguard Gold Certification.

2.2 ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
 3. Grade: Premium.
- B. Include preparations for mechanical, electrical, telephone, computer equipment and plumbing work required. Prepare cabinets, which contain computer equipment, to receive cooling fans, air slots for air circulation within the equipment area of sizes as shown or required and wireways for electrical, data and communication wires. Allow for cable conduits entering casework from different directions. In areas where shown or required, provide removable panels and access doors.
- C. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- D. Type of Construction: Frameless.
- E. Door and Drawer-Front Style: Flush overlay.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 1. Manufacturer and Product: As indicated in the Material Legend, on the Drawings.
 2. Face Sheets: NEMA Publication LD3, General Purpose Grade HGS, 0.048 in. nominal thickness, satin finish unless otherwise shown.
 3. Backing Sheets: Intended for use as a balancing sheet in panel construction; NEMA Publication LD3, Grade BKH, 0.048+ 0.005 in. thick.
 4. Cabinet Liner Sheets: Intended for use in cabinet interiors where shown; NEMA Publication LD-3, Grade CL20, 0.020 in. nominal thickness.
 5. Integrally Colored Solid Plastic Laminate: NEMA Publication LD3, Type HCS 62, 0.62 in. nominal thickness.
 6. Edges: Provide a NON-PVC edge banding complying with LMA EDG-1 on components with exposed or semi-exposed edges.

- G. Edges:
1. Finish edges with plastic laminate to match face sheets and apply before face sheets are applied, unless otherwise shown or specified.
 2. Cabinet body: Polyester tape, **0.018-inch (0.460-mm)** minimum thickness, matching laminate in color, pattern, and finish.
 3. Doors, Drawer fronts and Shelves: ABS edge banding, **0.12 inch (3 mm)** thick, matching laminate in color, pattern, and finish.
- H. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels, unless otherwise indicated on the Drawings.
- I. Materials for Semiexposed Surfaces:
1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade CLS.
 - a. Edges of Plastic-Laminate Shelves: ABS edge banding, **0.12 inch (3 mm)** thick, matching laminate in color, pattern, and finish.
 - b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - c. Concealed Backing Sheets: Intended for use as a balancing sheet in panel construction; NEMA Publication LD3, Grade BKH,
 2. Drawer Sides and Backs: Solid-hardwood lumber.
 3. Drawer Bottoms: Hardwood plywood, 3/8 inch minimum thickness.
- J. Dust Panels: **1/4-inch (6.4-mm)** plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- K. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- L. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Join subfronts, backs, and sides with glued dovetail joints.
- M. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated in the Materials Legend, on the Drawings.
- 2.3 SOLID-SURFACING-CLAD BENCHES.
- A. Materials:
1. Exposed surfaces: Solid surfacing-material.
 - a. Colors and patterns: As indicated in the Materials Legend, on the Drawings.
 2. Semi-exposed surfaces: Medium density overlay (MDO).
 3. Core: Composite wood core.
 4. Bench supports: See Section 05 50 00 "Metal Fabrications."
- 2.4 SOLID-SURFACING-CLAD BUMPER GUARD/HANDRAIL.
- A. Materials:

1. Exposed surfaces: Solid surfacing-material.
 - a. Colors and patterns: As indicated in the Materials Legend, on the Drawings.
2. Semi-exposed surfaces: Medium density overlay (MDO).
3. Core: Wood veneer core.
4. Wall Brackets:
 - a. Manufacturer: Rakks.
 - b. Product: HR-203 ADA Compliant Handrail Bracket for 7" Rail.
 - c. Material: Aluminum.
 - d. Spacing: 36 inches o.c. maximum.
 - e. Hardware: Screws to handrail: two #14 x 1 1/4" (included) phillips flathead wood screws. Screws to wall: two #14 x 2 1/2" Phillips flathead wood screws. Through bolt: one 1/4-20 x 1" carriage bolt. Lock nut: one 1/4-20 elastic stop nut.

2.5 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
 1. Wood Moisture Content: 8 to 13 percent.
- B. For casework to be installed in unconditioned spaces, bathrooms, pantries or other wet areas, and any cabinet to receive a sink, use moisture resistant MDF, moisture resistant particleboard core, or veneer core plywood.
- C. Composite Wood: Provide materials that comply with requirements of referenced quality standard for each type of ornamental woodwork and quality grade specified unless otherwise indicated. Meet requirement for recycled content or for certified wood:
 1. Recycled Content of MDF and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 100 percent.
 2. Certified Wood: MDF, Veneer and Particleboard products, certified as "FSC Pure" according to FSC STD-01-001 and FSC STD-40-004.
 3. Basis of Design Manufacturer for MDF and Particle Board: Subject to compliance with the requirements, provide products by Sierra Pine, (Roseberg) or comparable products by another Manufacturer acceptable to the Architect.
 4. Thermoset Decorative Panels: Particleboard with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
 5. Softwood Plywood: DOC PS 1, medium-density overlay.
- D. Composite Wood Products: Products, made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

2.6 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction

and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of the burners at any time during the test.

1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
4. Mill lumber before treatment and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of architectural cabinets.

2.7 SOLID SURFACING MATERIAL

- A. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.
1. Manufacturer: Subject to compliance with requirements, provide the products indicated in the Materials Legend, on the Drawings.
 2. Thickness: As indicated on the Drawings.

2.8 QUARTZ AGGLOMERATE MATERIALS

- A. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with ICPA SS-1, except for composition.
1. Manufacturers: As indicated in the Materials Legend, on the Drawings.
 2. Thickness: As indicated.
 3. Colors and Patterns: As indicated in the Materials Legend, on the Drawings, or if not indicated, as selected by Architect from industry full range.

2.9 DECORATIVE RESIN PANELS

- A. Decorative Resin Panels [**RP-01**]: Subject to compliance with the requirements, provide the manufacturer, and product indicated in the Materials Legend, on the Drawings.

- B. Engineered polyester resin
 - 1. Sheet Size: Maximum 4' x 10'
 - 2. Thickness: As indicated, on the Drawings.
 - 3. Interlayer Materials: Compatible with polyesters and bonding process to create a monolithic sheet of material when complete.
 - 4. Colors, Patterns and Textures: As indicated in the Materials Legend, on the Drawings.

- C. Sheet minimum performance attributes:
 - 1. Rate of Burning (ASTM D 635). Material must attain CC1 Rating for a nominal thickness of 1.5 mm (0.060 in.) and greater.
 - 2. Self-Ignition Temperature (ASTM D 1929). Material must have a Self-ignition temperature greater than 650°F.
 - 3. Density of Smoke (ASTM D 2843). Material must have a smoke density less than 75%.
 - 4. Flame spread and Smoke developed testing (ASTM E 84). Material must be able to meet a level of Class A (Flame spread less than 25 and smoke less than 450) at thickness of 1".
 - 5. Room Corner Burn Test (NFPA 286). Material must meet Class A criteria at ¼" thickness as described by the 2006 International Building Code.
 - 6. Extent of Burning (UL 94). Must submit UL card.
 - 7. Impact strength. Minimum impact strength test as measured by ASTM D 3763 of 20 ft. lbs. (for durability, shipping, installation, and use).
 - 8. Safety Glazing. Material must attain a Class A impact rating in accordance with ANSI Z97.1-2004 at 1/8" thickness.
 - 9. UPITT Test for Combustion Product Toxicity: Product must be recorded as "not more toxic than wood".
 - 10. Dynamic environmental testing (ASTM standards D 5116 and D 6670). Panels must not have detectable VOC off-gassing agents and must be have Greenguard™ Indoor Air Quality certified.
 - 11. Panels must be produced from a minimum of 40% post-industrial recycle content. This recycle content must be certified by a recognized 3rd party certification group, such as Scientific Certification Systems (SCS).
 - 12. Building Approvals: Plastic Fabrications are to have been evaluated and must be registered with and comply to requirements of the following jurisdictions:
 - a. Los Angeles Department of Building and Safety (Product must have a LARR Los Angeles Research Report number) for use as Light-transmitting Panels

2.10 CABINET HARDWARE AND ACCESSORIES

- A. Hardware Standard: Comply with BHMA A156.9 "American National Standard for Cabinet Hardware" for items specified or shown by reference to BHMA numbers or referenced to this standard. BHMA numbers are used below to designate hardware requirements. Provide the following architectural hardware, except where other items are indicated on drawings.

- B. Catches: Magnetic catches, BHMA A156.9, B03141 Roller catches, BHMA A156.9, B03071.

- C. Drawer Slides: BHMA A156.9.
 - 1. Grade 1: Side mounted.

- a. Type: Full extension.
 - b. Material: Zinc-plated or Epoxy-coated steel with polymer rollers.
 2. Box Drawer Slides: Grade 1HD-100. "Model No. 7432" (Accuride) up to 100 lbs.; full extension, progressive movement, rail mounted.
 3. File Drawer Slides: Grade 1HD-200. "Model No. 4034 (Accuride) up to 150 lbs and max. 30 in. drawer width; and "Model No. 3640 (Accuride) up to 200 lbs and drawer width 30 in. and up.
 4. Pencil Drawer Slides: Grade 1. "Model No.2632" (Accuride) up to 65 lbs., full extension, rail mount, for shallow drawers up to 3 in. deep.
 5. For trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide, provide Grade 1HD-200.
- D. Slides for Sliding Glass Doors: BHMA A156.9, B07063; plastic.
- E. Frameless Concealed (European Type) Hinges: BHMA B01602. Provide "3903 Snap-On 3000 Concealed Hinges" (Grass); self-closing.
- F. Self-Closing Spring Loaded Mortise Hinges: Steel with chrome finish: "8401" (McMaster Catalog); sized for size and weight of door panel.
- G. Pulls: Doug Mockett DP 128, Stainless steel.
- H. Locks: Provide locks appropriate to purpose intended as manufactured by Dom or Timberline unless otherwise shown or specified.
1. Door Locks: BHMA E07121; stainless steel with brushed finish.
 2. Drawer Locks: BHMA E07041 stainless steel with brushed finish.
- I. Pushbutton Cabinet Lock: Lockey Door and Gate Security Hardware; Lockey C-170 Pushbutton Cabinet Lock.
1. Surface Mount Cam Lock for Cabinet Doors
 2. Easy to Change Code
 3. Compatible with Thin Door Kit (TDK) for Applications 1/4" - 1" Thick
 4. Dimensions: 5" (H) x 1-3/16" (W)
 5. Finish: Dull Chrome.
- J. Flush bolts: "No. 40, Concealed Screw Surface Bolt" (H. B. Ives), or approved equal, 6 in. long, furnished with top and bottom mortised strike plates.
- K. Cabinet Shelf Supports (pin-type for cabinets with holes in sides): BHMA B04013. "No. 282.11.761" (Hafele) or approved equal, for use with predrilled holes in sides of cabinet for medium duty application.
- L. Cabinet shelf supports (morticed plaster standards and supports) where indicated: Knap and Vogt 233 Series Surface-Mount Pilaster Standards, and 256 shelf rests.
- M. Shelf Brackets and Standards, for closet and utility shelving:
1. Vertical slotted shelf standards, BHMA A156.9, B04102
 2. Shelf brackets for slotted standards, BHMA A156.9, B04112.
- N. Heavy Duty Shelf Standards and Brackets: Knap and Vogt #83 heavy duty standards; with shelf brackets #183 series.

- O. Hang Rods: Provide where shown, including accessories.
 - 1. Tubing: 1-5/16 in. outside diameter. Stainless steel with brushed finish; "No. B-3395" (Garcy Corp.).
 - 2. End Flanges: To suit diameter of tubing; "No. B-3369" (Garcy Corp.). Stainless steel with brushed finish.
- P. Door and Drawer Silencers: BHMA A156.16, L03011.
- Q. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, 6 mm thick unless otherwise indicated.
 - 1. Unframed Glass Doors: Seam exposed edges seamed before tempering.
- R. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.
- S. Concealed countertop and fixed shelf support brackets:
 - 1. Rangine Corporation; Rakks, Countertop brackets. EH-Inside Wall Mount series, size for countertop or shelf depth. Clear anodized finish. For use at Metal Framed partitions.
 - 2. Faceplates: Provide EH-FR-22, or-23 aluminum faceplates with adhesive backing and notched to fit around vertical flange of flush mounted counter support bracket and conceal penetration through gypsum board providing neat, finished appearance.
- T. Exposed countertop and fixed shelf support brackets:
 - 1. Rangine Corporation; Rakks, Countertop brackets. Exposed mount, EH-Surface Mount Series, size for countertop or shelf depth. Clear anodized finish. For use at Metal Framed partitions.
- U. Grommets for Cable Passage through Countertops: 2-inch OD, plated steel grommets and matching caps with slot for wire passage of color matching color of adjacent work surfaces.
 - 1. Product: Subject to compliance with requirements, provide "PS series" by Doug Mockett & Company, Inc.
 - 2. Color: As selected by the Architect.
- V. Wire Management Tray: # 829.15.302 by Hafale with black finish.
- W. Levelers: Heavy duty steel channel type.
- X. Work Surface Legs: "TL27" (Doug Mockett); with satin chrome finish; 4 inch diameter work surface leg, x height required for use, with plate leveler.
- Y. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 - 2. Satin Stainless Steel: BHMA 630.
- Z. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.11 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.12 FABRICATION

- A. Fabricate architectural cabinets, benches and bumper/handrails to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- D. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual."
 - 1. For glass in frames, secure glass with removable stops.
 - 2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)** using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than **16 inches (400 mm)** o.c..

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION

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SECTION 06 42 16

FLUSH WOOD PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flush wood paneling.
2. Wood furring, blocking, shims, and hanging strips for installing flush wood paneling that is not concealed within other construction.
3. Shop finishing of flush wood paneling.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 05 75 00 "Decorative Formed Metal" for metal reveals at plastic-laminate-faced wood paneling.
4. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing paneling that is concealed within other construction before paneling installation.

1.2 COORDINATION

- ###### A.
- Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that paneling can be installed as indicated.

1.3 PREINSTALLATION MEETINGS

- ###### A.
- Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For flush wood paneling.
1. Include plans, elevations, sections, and attachment details.
 2. Show details full size.
 3. Show locations and sizes of furring and blocking, including concealed blocking specified in other Sections.
 4. For paneling produced from premanufactured sets, show finished panel sizes, set numbers, sequence numbers within sets, and method of cutting panels to produce indicated sizes.

5. For paneling veneered in fabrication shop, show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
 6. Apply AWI Quality Certification Program label to Shop Drawings.
- D. Samples: For each exposed product and for each color and finish specified, in manufacturer's or fabricator's standard size.
 - E. Samples for Initial Selection: For each type of exposed finish.
 - F. Samples for Verification: For the following:
 1. Lumber for Transparent Finish: Not less than 5 inches (125 mm) wide by 12 inches (300 mm) long, for each species and cut, finished on one side and one edge.
 2. Prefinished Veneer-Faced Panel Products for Transparent Finish: 12 by 24 inches, for each species and cut. Include at least one face-veneer seam and finish as specified.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer and fabricator.
 - B. Product Certificates: For each type of product.
 - C. Quality Standard Compliance Certificates: AWI Quality Certification Program.
 - D. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.
- 1.6 QUALITY ASSURANCE
- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 1. Shop Certification: AWI's Quality Certification Program accredited participant.
 2. Shop is certified for chain of custody by an FSC-accredited certification body.
 - B. Installer Qualifications: Fabricator of products.
 - C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 1. Build mockups of typical paneling as shown on Drawings, or if not shown, 100 sq. ft. mockup, including inside and outside corners, base and junctions with adjacent materials.
 - a. Include interface between wood paneling and glass wall cladding.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Do not deliver paneling until painting and similar operations that might damage paneling have been completed in installation areas. Store paneling in installation

areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install paneling until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where paneling is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support paneling by field measurements before being enclosed/concealed by construction and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where paneling is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PANELING FABRICATORS

- A. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of paneling and wood-veneer-faced architectural cabinets.

2.2 PANELING, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of flush wood paneling (wood-veneer wall surfacing) indicated for construction, finishes, installation, and other requirements.
 - 1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
 - 2. The Contract Documents contain requirements that are more stringent than the referenced woodwork quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. LEED Performance Requirements:
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2. Provide interior architectural wood paneling products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
3. Provide composite wood products that meet Composite Wood Evaluation requirements, as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
4. LEED Requirements: Provide wood fiber board and particle board products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

2.3 FLUSH WOOD PANELING [**WD-01**]

- A. Grade: Premium.
- B. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- C. Wood Species and Cut:
 1. Prefinished veneered panels: As indicated in the materials legend, on the drawings.
- D. Panel Core Construction: Fire-retardant particleboard or fire-retardant MDF.
 1. Thickness: **3/4 inch (19 mm)**.
- E. Exposed Panel Edges: Inset solid-wood or wood-veneer matching faces.
 1. Finish to match prefinished panels.
- F. Panel Reveals: As indicated on the Drawings.
- G. Fire-Retardant-Treated Paneling: Panels shall consist of wood-veneer and fire-retardant particleboard or fire-retardant, medium-density fiberboard (MDF). Panels shall have a flame-spread index of 25 or less and a smoke-developed index of 450 or less per ASTM E 84, and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
- H. Assemble panels by gluing and concealed fastening.

2.4 MATERIALS

- A. Materials, General: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.
- B. Wood Moisture Content: 8 to 13 percent.
- C. Composite Wood: Provide materials that comply with requirements of referenced quality standard for each type of ornamental woodwork and quality grade specified unless otherwise indicated. Meet requirement for recycled content or for certified wood:
 1. Recycled Content of MDF and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 100 percent.
 2. Certified Wood: MDF and Particleboard products, certified as "FSC Pure" according to FSC STD-01-001 and FSC STD-40-004.

- D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Metal Trim: See Section 05 75 00 Decorative formed metal for metal trim.

2.5 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
 - 1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 - 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 75 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of the burners at any time during the test.
 - 1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
 - 2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
 - 3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
 - 4. Mill lumber before treatment and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of paneling.
- C. Fire-Retardant Particleboard: Made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 75 or less and smoke-developed index of 25 or less per ASTM E 84.
 - 1. For panels **3/4 inch (19 mm)** thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, **1600 psi (11 MPa)**; modulus of elasticity, **300,000 psi (2070 MPa)**; internal bond, **80 psi (550 kPa)**; and screw-holding capacity on face and edge, **250 and 225 lbf (1100 and 1000 N)**, respectively.
- D. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at

time of panel manufacture to achieve flame-spread index of 75 or less and smoke-developed index of 200 or less per ASTM E 84.

2.6 INSTALLATION MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls.
- C. Installation Adhesive: Product recommended by panel fabricator for each substrate for secure anchorage.
 - 1. Adhesives shall have a VOC content of 70 g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.7 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Arrange paneling in shop or other suitable space in proposed sequence for examination by Architect. Mark units with temporary sequence numbers to indicate position in proposed layout.
 - 1. Lay out one elevation at a time if approved by Architect.
 - 2. Notify Architect seven days in advance of the date and time when layout will be available for viewing.
 - 3. Provide lighting of similar type and level as that of final installation for viewing layout unless otherwise approved by Architect.
 - 4. Rearrange paneling as directed by Architect until layout is approved.
 - 5. Do not trim end units and other nonmodular-size units to less than modular size until after Architect's approval of layout. Indicate trimming by masking edges of units with nonmarking material.
 - 6. Obtain Architect's approval of layout before start of assembly. Mark units and Shop Drawings with assembly sequence numbers based on approved layout.
- C. Complete fabrication, including assembly, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times paneling fabrication will be complete.
- D. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.8 SHOP FINISHING

- A. General: Finish paneling at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
- B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing paneling, as applicable to each unit of work.
 - 1. Backpriming: Apply two coats of sealer or primer, compatible with finish coats, to concealed surfaces of paneling.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: System - 10, water-based UV curable or -11, or catalyzed polyurethane.
 - 3. Wash Coat for Closed-Grain Woods: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
 - 4. Staining: Match Architect's sample.
 - 5. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
 - 6. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition paneling to humidity conditions in installation areas.
- B. Before installing paneling, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install paneling to comply with quality standard grade of paneling to be installed.
- B. Install paneling level, plumb, true in line, and without distortion. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)**. Install with no more than **1/16 inch in 96-inch (1.6 mm in 2400-mm)** vertical cup or bow and **1/8 inch in 96-inch (3 mm in 2400-mm)** horizontal variation from a true plane.
 - 1. For flush paneling with revealed joints, install with variations in reveal width, alignment of top and bottom edges, and flushness between adjacent panels not exceeding **1/32 inch (0.8 mm)**.
- C. Anchor paneling to supporting substrate with concealed panel-hanger clips.
 - 1. Do not use face fastening unless otherwise indicated.
- D. Complete finishing work specified in this Section to extent not completed at shop or before installation of paneling. Fill nail holes with matching filler where exposed.

1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective paneling, where possible, to eliminate defects. Where not possible to repair, replace paneling. Adjust for uniform appearance.
- B. Clean paneling on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

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SECTION 06 42 19

PLASTIC-LAMINATE-FACED WOOD PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced wood paneling.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced wood paneling that is not concealed within other construction.

B. Related Requirements:

C. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

D. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 05 75 00 "Decorative Formed Metal" for metal reveals at plastic-laminate-faced wood paneling.
4. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing paneling that is concealed within other construction before paneling installation.

1.2 COORDINATION

- ###### A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that paneling can be installed as indicated.

1.3 PREINSTALLATION MEETINGS

- ###### A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For plastic-laminate-faced wood paneling.
1. Include plans, elevations, sections, and attachment details.
 2. Show details full size.
 3. Show locations and sizes of furring and blocking, including concealed blocking specified in other Sections.
 4. Apply AWI Quality Certification Program label to Shop Drawings.
- D. Samples: For each exposed product and for each color and texture specified, in manufacturer's or fabricator's standard size.

- E. Samples for Initial Selection: For each type of plastic laminate.
- F. Samples for Verification: For each type of exposed laminate, 8 by 10 inches (200 by 250 mm).
 - 1. Provide one Sample applied to core material.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For each type of product.
- C. Quality Standard Compliance Certificates: AWI Quality Certification Program.
- D. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Shop Certification: AWI's Quality Certification Program accredited participant.
 - 2. Shop is certified for chain of custody by an FSC-accredited certification body.
- B. Installer Qualifications: Fabricator of products.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of typical paneling as shown on Drawings.
 - a. Include joint between panels, interior and exterior corners,
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver paneling until painting and similar operations that might damage paneling have been completed in installation areas. Store paneling in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install paneling until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install paneling until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

- C. Field Measurements: Where paneling is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support paneling by field measurements before being enclosed/concealed by construction and indicate measurements on Shop Drawings.
- D. Established Dimensions: Where paneling is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PANELING FABRICATORS

- A. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of paneling and plastic laminate-faced architectural cabinets.

2.2 PANELING, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-faced wood paneling (decorative laminate surfacing) indicated for construction, finishes, installation, and other requirements.
 - 1. Provide inspections including installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
 - 2. The Contract Documents contain requirements that are more stringent than the referenced woodwork quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. LEED Performance Requirements:
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide interior architectural wood paneling products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 3. Provide composite wood products that meet Composite Wood Evaluation requirements, as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 4. LEED Requirements: Provide wood fiber and particle board products and plastic laminate products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

2.3 PLASTIC-LAMINATE-FACED WOOD PANELING

- A. Grade: Premium.
- B. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- C. Plastic Laminate [**PL-04**]: High-pressure decorative laminate complying with NEMA LD 3 and the following requirements, unless otherwise indicated:
 - 1. HPL White Board Laminate With ThruColor Core:
 - 2. Faces: Type MB1 (.048 inch thickness).
 - 3. Backs: Grade BKV.
 - 4. Exposed Edges: Same as faces.
- D. Panel Core: Fire-retardant particleboard or fire-retardant MDF.
 - 1. Thickness: 3/4 inch (19 mm).
- A. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Fire-Retardant-Treated Paneling: Panels shall consist of fire-retardant plastic laminate and fire-retardant particleboard or fire-retardant, medium-density fiberboard (MDF). Panels shall have a flame-spread index of 75 or less and a smoke-developed index of 450 or less per ASTM E 84, and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Assemble panels by gluing and concealed fastening.

2.4 MATERIALS

- A. Materials, General: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.
- B. Wood Moisture Content: 5 to 10 4 to 9 percent.
- C. Composite Wood: Provide materials that comply with requirements of referenced quality standard for each type of ornamental woodwork and quality grade specified unless otherwise indicated. Meet requirement for recycled content or for certified wood:
 - 1. Recycled Content of MDF and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 100 percent.
 - 2. Certified Wood: MDF and Particleboard products, certified as "FSC Pure" according to FSC STD-01-001 and FSC STD-40-004.

2.5 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 75 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
 2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
 3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
 4. Mill lumber before treatment and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of paneling.
- C. Fire-Retardant Particleboard: Made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 75 or less and smoke-developed index of 25 or less per ASTM E 84.
1. For panels 3/4 inch (19 mm) thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi (11 MPa); modulus of elasticity, 300,000 psi (2070 MPa); internal bond, 80 psi (550 kPa); and screw-holding capacity on face and edge, 250 and 225 lbf (1100 and 1000 N), respectively.
- A. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 75 or less and smoke-developed index of 200 or less per ASTM E 84.
- ## 2.6 INSTALLATION MATERIALS
- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls.

- C. Installation Adhesive: Product recommended by panel fabricator for each substrate for secure anchorage.
 - 1. Adhesives shall have a VOC content of 70 g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.7 FABRICATION

- A. Complete fabrication, including assembly, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times paneling fabrication will be complete.
- B. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition paneling to humidity conditions in installation areas.
- B. Before installing paneling, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install paneling to comply with quality standard grade of paneling to be installed.
- B. Install paneling level, plumb, true in line, and without distortion. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)**. Install with no more than **1/16 inch in 96-inch (1.6 mm in 2400-mm)** vertical cup or bow and **1/8 inch in 96-inch (3 mm in 2400-mm)** horizontal variation from a true plane.
 - 1. For flush paneling with revealed joints, install with variations in reveal width, alignment of top and bottom edges, and flushness between adjacent panels not exceeding **1/32 inch (0.8 mm)**.
- C. Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening unless covered by trim.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective paneling, where possible, to eliminate defects. Where not possible to repair, replace paneling. Adjust for uniform appearance.
- B. Clean paneling on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 06 83 16

FIBERGLASS REINFORCED PLASTIC LAMINATE PANELING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes fiberglass reinforced plastic laminate paneling on interior walls.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 - 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 ACTION SUBMITTALS

- A. Product Data: For each variety of fiberglass reinforced plastic laminate, fiberglass reinforced plastic laminate accessory, and manufactured product.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:

- c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Show fabrication and installation details for fiberglass reinforced plastic laminate paneling system, including dimensions and profiles of fiberglass reinforced plastic laminate units.
- 1. Show locations and details of joints both within fiberglass reinforced plastic laminate paneling system and between fiberglass reinforced plastic laminate paneling system and other finish materials.
 - 2. Show direction of veining, grain, or other directional pattern.
- D. Samples for Verification:
- 1. For each fiberglass reinforced plastic laminate type indicated. Samples shall show the full range of variations in appearance characteristics in completed Work.
 - 2. For each color of sealant required.

1.3 INFORMATIONAL SUBMITTALS

- A. Material Test Reports:
 - 1. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer indicating that sealants will not stain or damage fiberglass reinforced plastic laminate. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.
- B. Qualification Data: for Fabricator and installer.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fiberglass reinforced plastic laminate paneling to include in maintenance manuals. Include product data for fiberglass reinforced plastic

laminated-care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of typical fiberglass reinforced plastic laminate paneling as shown on Drawings, if not shown, mock 8 linear feet of full height paneling, including a panel to panel joint, an interior corner and an exterior corner.
 - 2. See Section 01 43 39 "Room Mockup requirements" for room mockups requiring fiberglass reinforced plastic laminate paneling.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Sealant Adhesion and Compatibility Testing: Submit to joint-sealant manufacturers, for compatibility and adhesion testing according to sealant manufacturer's standard testing methods and Section 07 92 00 "Joint Sealants," Samples of materials that will contact or affect joint sealants.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle fiberglass reinforced plastic laminate and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, and other causes.
 - 1. Store components indoors prior to installation.
 - 2. Handle materials to prevent damage to finished surfaces.
 - a. Provide protective coverings to prevent physical damage or staining following installation for duration of project.
- B. Mark fiberglass reinforced plastic laminate units, on surface that will be concealed after installation, with designations used on Shop Drawings to identify individual fiberglass reinforced plastic laminate units. Orient markings on vertical panels so that they are right side up when units are installed.
- C. Deliver sealants to Project site in original unopened containers labeled with manufacturer's name, product name and designation, color, expiration period, pot life, curing time, and mixing instructions for multicomponent materials.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install solid surfacing paneling until building is enclosed, wet work is complete, and HVAC system is operating and

maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

- B. Field Measurements: Verify dimensions of construction to receive fiberglass reinforced plastic laminate paneling by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 COORDINATION

- A. Time delivery and installation of fiberglass reinforced plastic laminate paneling to avoid extended on-site storage and to coordinate with work adjacent to fiberglass reinforced plastic laminate paneling.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. LEED Performance Requirements:
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide interior architectural plastic laminate products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 3. Provide plastic laminate products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
- B. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke Developed: Less than 450.

2.2 MANUFACTURERS

- A. Fiber glass reinforced plastic laminate [**PL-03**]:
 - 1. Manufacturer: Subject to compliance with requirements, provide products by the following:
 - a. Panolam.
 - 2. Nominal Thickness: NEMA LD 3-2005 3.13, 0.075 inches
 - 3. Surface Burning Characteristics: ASTM E84; Class A*
 - 4. Wear Resistance: (cycles) NEMA 3.13; 3500
 - 5. Flexural Strength: ASTM D790, 22,000 psi

6. Colors and Patterns: As indicated in the Materials Legend, on the Drawings.

2.3 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions and two piece aluminum and vinyl trims designed to retain and cover edges of panels. Provide division bars, inside corners, and caps as indicated and as needed to conceal edges.
 1. Color: Match panels.

2.4 ADHESIVES

- A. Adhesive: As recommended by fiberglass reinforced plastic laminate manufacturer.
 1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 SEALANTS

- A. Joint Sealants: Manufacturer's standard sealants that comply with applicable requirements in Section 07 92 00 "Joint Sealants" and will not stain the fiberglass reinforced plastic laminate they are applied to.
 1. Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.
 2. Colors: Provide colors of exposed sealants to match other joints in fiberglass reinforced plastic laminate adjoining sealed joints unless otherwise indicated.
 3. Sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FIBERGLASS REINFORCED PLASTIC LAMINATE ACCESSORIES

- A. Cleaner: Fiberglass reinforced plastic laminate cleaner specifically formulated for fiberglass reinforced plastic laminate types, finishes, and applications indicated, as recommended by fiberglass reinforced plastic laminate producer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.

2.7 FIBERGLASS REINFORCED PLASTIC LAMINATE FABRICATION, GENERAL

- A. Carefully inspect finished fiberglass reinforced plastic laminate units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

2.8 FIBERGLASS REINFORCED PLASTIC LAMINATE PANELING ON WALLS

- A. Substrate for applications: See Section 09 29 00 Gypsum Board for substrate materials.
 1. Dry applications: Glass-Mat Interior Gypsum Board.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive fiberglass reinforced plastic laminate paneling and conditions under which fiberglass reinforced plastic laminate paneling will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fiberglass reinforced plastic laminate paneling.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of fiberglass reinforced plastic laminate paneling.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING FIBERGLASS REINFORCED PLASTIC LAMINATE, WALL FACING GENERAL

- A. Before setting fiberglass reinforced plastic laminate, clean surfaces that are dirty or stained by removing soil, stains, and foreign materials. Clean fiberglass reinforced plastic laminate by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
- B. Do necessary field cutting as fiberglass reinforced plastic laminate is set. Use power saws with blades recommended by the fiberglass reinforced plastic laminate manufacturer to cut fiberglass reinforced plastic laminate. Cut lines straight and true, with edges eased slightly to prevent snipping. Finish cut edges the same as shop fabricated edges.
- C. Contiguous Work: Provide reveals and openings as required to accommodate contiguous work.
- D. Erect fiberglass reinforced plastic laminate units level, plumb, and true with uniform joint widths. Use temporary shims to maintain joint width.
- E. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.
 - 1. Sealing of expansion and other joints is specified in Section 07 92 00 "Joint Sealants."
 - 2. Keep expansion joints free of adhesive, and other rigid materials.

3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed **1/8 inch in 96 inches (3 mm in 2400 mm)**, **1/4 inch (6 mm)** maximum.
- B. Variation from Level: For lintels, sills, chair rails, horizontal bands, horizontal grooves, and other conspicuous lines, do not exceed **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, **3/8 inch (10 mm)** maximum.

- C. Variation of Linear Building Line: For position shown in plan and related portion of walls and partitions, do not exceed **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, **3/8 inch (10 mm)** maximum.
- D. Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions indicated, do not exceed plus or minus **1/8 inch (3 mm)**.
- E. Variation in Joint Width: Do not vary from average joint width more than plus or minus **1/16 inch (1.5 mm)** or one-fourth of nominal joint width, whichever is less.
- F. Variation in Plane between Adjacent Fiberglass reinforced plastic laminate Units (Lipping): Do not exceed **1/32-inch (0.8-mm)** difference between planes of adjacent units.

3.4 INSTALLATION OF FIBERGLASS REINFORCED PLASTIC LAMINATE WALL FACING

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive and nails or staples. Do not fasten through panels.
- D. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.
- G. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
 - 1. Exposed joints/seams shall not be allowed.
 - 2. Cut and finish component edges with clean, sharp returns.
 - 3. Carefully dress joints smooth, remove surface scratches and clean entire surface.

3.5 JOINT-SEALANT INSTALLATION

- A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Section 07 92 00 "Joint Sealants." Remove temporary shims before applying sealants.

3.6 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean fiberglass reinforced plastic laminate paneling as work progresses. Remove adhesive, and sealant smears immediately.
- B. Remove and replace fiberglass reinforced plastic laminate paneling of the following description:

1. Broken, chipped, stained, or otherwise damaged fiberglass reinforced plastic laminate. Fiberglass reinforced plastic laminate may be repaired if methods and results are approved by Architect.
 2. Defective fiberglass reinforced plastic laminate paneling.
 3. Defective joints, including misaligned joints.
 4. Fiberglass reinforced plastic laminate paneling and joints not matching approved Samples and mockups.
 5. Fiberglass reinforced plastic laminate paneling not complying with other requirements indicated.
- C. Replace in a manner that results in fiberglass reinforced plastic laminate paneling that matches approved Samples and mockups, complies with other requirements, and shows no evidence of replacement.
- D. Clean fiberglass reinforced plastic laminate paneling, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage fiberglass reinforced plastic laminate.

3.7 PROTECTION

- A. Protect fiberglass reinforced plastic laminate surfaces, edges, and corners from construction damage. Use securely fastened untreated wood, plywood, or heavy cardboard to prevent damage.
- B. Before inspection for Substantial Completion, remove protective coverings and clean surfaces.

END OF SECTION

SECTION 07 18 00

TRAFFIC COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes traffic coatings for the following applications:
 - 1. Interior, equipment room floor coating.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections include the following:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 03 Section "Cast-in-Place Concrete" for concrete substrates.

1.2 ACTION SUBMITTALS

- A. Product Data: For each product indicated.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS – LEED v4 For Building Design & Construction – New Construction", for all permanently installed products and materials:
 - 1. LEED Product Submittals
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit MR 2: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.

- b. Materials and Resources, Credit MR 2: Building Products Disclosure and Optimization – Environmental Product Declarations. Option 2. Multi-attribute Optimization.
 - c. Materials and Resources, Credit MR 3: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting.
 - d. Materials and Resources, Credit MR 3: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - e. Materials and Resources, Credit MR 4: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - f. Materials and Resources, Credit MR 4: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - g. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
- C. Shop Drawings: Show extent of each traffic coating. Include details for treating substrate joints and cracks, flashings, deck penetrations, and other termination conditions.
- D. Samples for Initial Selection: For each type of finish indicated.
- E. Samples for Verification: For each type of traffic coating required, prepared on rigid backing and of same thickness and material indicated for the Work.
- 1. Provide stepped Samples on backing large enough to illustrate buildup of traffic coatings.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Material Test Reports: For each traffic coating.
 - C. Material Certificates: For each traffic coating, signed by manufacturers.
 - D. Maintenance Data: For traffic coatings to include in maintenance manuals. Identify substrates and types of traffic coatings applied. Include recommendations for periodic inspections, cleaning, care, maintenance, and repair of traffic coatings.
 - E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of traffic coatings required for this Project, with five (5) years successful experience providing traffic coatings on projects of comparable type and scope to that required for this project.
- B. Source Limitations:
1. Obtain traffic coatings from a single manufacturer.
 2. Obtain primary traffic coating materials, including primers, from traffic coating manufacturer. Obtain secondary materials including aggregates, sheet flashings, joint sealants, and substrate repair materials of type and from source recommended in writing by primary material manufacturer.
- C. Mockups: Apply mockups to set quality standards for materials and execution.
1. Provide mock-ups of each type of traffic coating system specified and shown.
 2. Architect will identify one representative surface for each traffic coating and each substrate to receive traffic coatings. Apply each coating to at least **200 sq. ft. (18.5 sq. m)** of each substrate to demonstrate surface preparation, joint and crack treatment, thickness, texture, color, and standard of workmanship.
 3. Include surface preparation, materials details, and finish techniques that will be used in the actual building construction.
 4. Make changes and corrections, and reapply the coating to the mock-up as directed by the Architect. Remove and reapply mockups until they are approved by Architect.
 5. After changes, corrections and final review of the mock-up are completed keep the accepted mock-up application undisturbed during construction, as a standard of quality and workmanship for the actual work.
 6. Provide the following mock-up applications:
 - a. Interior penthouse floor, minimum 100 square feet plus adjacent wall base.
 7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
1. Before installing traffic coatings, meet with representatives of authorities having jurisdiction, manufacturer's technical representative, Owner, Architect, consultants, independent testing agency, and other concerned entities. Review requirements for traffic coatings. Notify participants at least seven days before conference.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels showing the following information:
1. Manufacturer's brand name.
 2. Type of material.
 3. Directions for storage.

4. Date of manufacture and shelf life.
5. Lot or batch number.
6. Mixing and application instructions.
7. Color.

- B. Store materials in a clean, dry location protected from exposure to direct sunlight. In storage areas, maintain environmental conditions within range recommended in writing by manufacturer.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Apply traffic coatings within the range of ambient and substrate temperatures recommended in writing by manufacturer. Do not apply traffic coatings to damp or wet substrates, when temperatures are below **40 deg F (5 deg C)**, when relative humidity exceeds 85 percent, or when temperatures are less than **5 deg F (3 deg C)** above dew point.
1. Do not apply traffic coatings in snow, rain, fog, or mist, or when such weather conditions are imminent during the application and curing period. Apply only when frost-free conditions occur throughout the depth of substrate.
- B. Do not install traffic coating until items that will penetrate membrane have been installed.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which traffic coating manufacturer agrees to repair or replace traffic coatings that deteriorate during the specified warranty period. Warranty does not include deterioration or failure of traffic coating due to unusual weather phenomena, failure of prepared and treated substrate, formation of new substrate cracks exceeding **1/16 inch (1.6 mm)** in width, fire, vandalism, or abuse by snowplow, maintenance equipment, and truck traffic.
1. Deterioration of traffic coatings includes the following:
 - a. Adhesive or cohesive failures.
 - b. Abrasion or tearing failures.
 - c. Surface crazing or spalling.
 - d. Intrusion of water, oils, gasoline, grease, salt, deicer chemicals, or acids into deck substrate.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Traffic Coatings: Complying with ASTM C 957.
- B. Material Compatibility: Provide primers; base, intermediate, and topcoats; and miscellaneous materials that are compatible with one another and with substrate

under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.2 PERFORMANCE REQUIREMENTS

A. LEED Performance Requirements

1. VOC Content: Provide traffic coatings, for use inside the weatherproofing system, with VOC content of 150 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

- B. Traffic Coating: Use traffic coating that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 TRAFFIC COATING

- A. Traffic Coating System: Multi-layered troweled applied floor designed for use as a waterproof flooring system for mechanical equipment rooms above occupied areas.

- B. Basis of Design: Subject to compliance with the requirements, provide Dex-O-Tex/Crossfield Products Corp.; M-E Flooring; Waterproofing Mechanical Equipment Room Floor System,

C. Additional accepted products:

1. PEDDA-GARD FC; Neogard a division of Jones-Blair,
2. U-62 Gaco Western; with Zero VOC sealer."

- D. Products: Subject to compliance with requirements, provide the specified product, accepted product, or comparable products from one of the following manufacturers:

1. Carlisle Coatings & Waterproofing, Inc.
2. Dex-O-Tex/Crossfield Products Corp.
3. Gaco Western, Inc.
4. Neogard, Division of Jones-Blair.
5. Tremco Incorporated, Sealant/Waterproofing Division

- E. Multi-layered trowel applied waterproof flooring surfacing system shall be composed of a primer bondcoat, waterproof membrane, traffic surfacing and finish coats:

1. Primer: Provide primer recommended by the Manufacturer for the concrete surface conditions encountered.
2. Traffic surface binder and all rubber emulsions shall be compounded with an aqueous synthetic rubber liquid containing no hydrocarbon solvents.

3. Aggregate for traffic surface coating shall be suitably graded mineral aggregate passing a #20 mesh sieve and retained on a #80 mesh sieve.
4. Fabric used as reinforcement for waterproof base and floor shall be 7 ½ oz. woven polypropylene fabric.
5. Final Finish dressing shall be a single component, water-phase acrylic latex emulsion material, pigmented and of a consistence suitable for roller application.
6. Color: As selected by the Architect from Manufacturer's standard colors.

2.4 PROPERTIES

- A. Waterproofness (Smith Emery Laboratories Test Procedure) Sample 18" diam. subjected to 50 lbs per inch water pressure for 60 mins. Test for amount of water forced through in grams.
- B. Tensile Strength & Elongation (ASTM D1117):
 1. Elongation Dry: 29.0%
 2. Breakload Dry: 106 lbs. per inch
 3. Elongation Wet: 31.0%
 4. Breakload Wet: 67 lbs. per inch
- C. Strip Adhesion (Strip adhesion measured in per linear inch force required to pull up membrane: 19.2 lbs. per inch
- D. Indentation Characteristics (MIL-D-3134, Para. 4.7.3) (Steadily Applied Load) (2000 lbs. on 1" steel ram imposed for 30 minutes): 5%
- E. Indentation Characteristics (MIL-D-3134, Para. 4.7.3) (Impacted Load 2 lb. Steel ball dropped from 8 foot height): No cracking or loosening
- F. Resistance to Elevated Temperature (MIL-D-3134, Para 4.7.5.1): No flow or slip
- G. Slip Resistance (Coefficient of Friction): Not less than 0.6 according to ASTM D 2047.

2.5 MISCELLANEOUS MATERIALS

- A. Joint Sealants: As specified in Division 07 Section "Joint Sealants."
- B. Pavement-Marking Paint: MPI #97 Latex Traffic Marking Paint.
 1. Color: As selected by the Architect from Manufacturer's standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements and for other conditions affecting performance of traffic coatings.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 2. Verify compatibility with and suitability of substrates.

3. Begin coating application only after minimum concrete curing and drying period recommended by traffic coating manufacturer has passed, after unsatisfactory conditions have been corrected, and after surfaces are dry.
4. Verify that substrates are visibly dry and free of moisture.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Perform relative humidity test using in situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
5. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Clean and prepare substrates according to ASTM C 1127 and manufacturer's written recommendations to produce clean, dust-free, dry substrate for traffic coating application.
- B. Mask adjoining surfaces not receiving traffic coatings, deck drains, and other deck substrate penetrations to prevent spillage, leaking, and migration of coatings.
- C. Concrete Substrates: Mechanically abrade concrete surfaces to a uniform profile according to ASTM D 4259. Do not acid etch.
 1. Remove grease, oil, paints, and other penetrating contaminants from concrete.
 2. Remove concrete fins, ridges, and other projections.
 3. Remove laitance, glaze, efflorescence, curing compounds, concrete hardeners, form-release agents, and other incompatible materials that might affect coating adhesion.
 4. Remove remaining loose material to provide a sound surface, and clean surfaces according to ASTM D 4258.
 5. Use blast-cleaning equipment with re-circulating blast and a vacuum attachment to retain dust and debris.

3.3 TERMINATIONS AND PENETRATIONS

- A. Prepare vertical and horizontal surfaces at terminations and penetrations through traffic coatings and at expansion joints, drains, and sleeves according to ASTM C 1127 and manufacturer's written recommendations.
- B. Provide sealant cants at penetrations and at reinforced and nonreinforced, deck-to-wall butt joints.
- C. Terminate edges of deck-to-deck expansion joints with preparatory base-coat strip.

3.4 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout, and fill joints and cracks in substrates according to ASTM C 1127 and manufacturer's written recommendations. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.
 - 1. Comply with recommendations in ASTM C 1193 for joint-sealant installation.

3.5 TRAFFIC COATING APPLICATION

- A. Apply traffic coating material according to ASTM C 1127 and manufacturer's written recommendations.
 - 1. Start traffic coating application in presence of manufacturer's technical representative.
 - 2. Verify that wet film thickness of each component coat complies with requirements every 100 sq. ft. (9 sq. m).
- B. General: Apply each component of multi-layered troweled waterproof flooring surfacing system according to manufacturer's directions to produce a uniform monolithic surface of thickness indicated.
- C. Environmental Check Points: Measure and record ambient temperature, relative humidity, dew point, surface temperature, and material temperatures at the beginning of work, mid-day, and at the end of work each day work is performed on the project. Include this information with the joint installer manufactures guarantee as part of the project close out documents.
- D. Apply synthetic rubber waterproof membrane solution at all vertical junctures. Embed polypropylene fabric into membrane liquid.
- E. Apply synthetic rubber waterproof membrane solution with polypropylene fabric reinforcement to entire area to be coated. Overlap all seams a minimum of 2 inches.
- F. Trowel apply elasticized resin emulsion and aggregate composition traffic surfacing over all surfaces previously covered with waterproof membrane at nominal 1/8" finish thickness. Sand surface to remove trowel marks or small surface imperfections.
- G. Roller apply two coats of final finish dressing to a uniform finish.
- H. Finished waterproof mechanical equipment room floor surfacing shall be a nominal 3/16 inch thick, uniform in color and texture.
- I. Cove Base: Apply cove base mix to wall surfaces at locations shown to form cove base height indicated. Follow manufacturer's printed instructions and details including taping, mixing, troweling, and sanding, of cove base.
- J. Curbs and Bases: Apply cove base mix to wall surfaces at locations shown to form cove base, and extend over curbs and bases.

- K. Stripping: Provide stripping, color coating or other method to show egress paths. In general, these paths will be shown on drawings. Where widths are not shown, provide paths 72 inches wide, in approved locations.

3.6 CURING

- A. Cure multi-layered troweled waterproof flooring surface materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process. Close application area for a minimum of 24 hours.

3.7 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified testing agency to perform the following field tests and inspections and prepare test reports:
 - 1. Samples of material delivered to Project site shall be taken, identified, sealed, and certified in presence of Construction Manager.
 - 2. Testing agency shall perform tests for characteristics specified, using applicable referenced testing procedures.
 - 3. Testing agency shall verify thickness of coatings during traffic coating application.
 - 4. If test results show traffic coating materials do not comply with requirements, remove noncomplying materials, prepare surfaces, and reapply traffic coatings.
- B. Flood Testing: Flood test each deck area for leaks, according to recommendations in ASTM D 5957, after traffic coating has completely cured. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - 1. Flood to an average depth of 2-1/2 inches (65 mm) with a minimum depth of 1 inch (25 mm) and not exceeding a depth of 4 inches (100 mm).
 - 2. Flood each area for 48 hours.
 - 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until traffic coating installation is watertight.
 - 4. Owner will engage an independent testing agency to observe flood testing and examine underside of decks and terminations for evidence of leaks during flood testing.
- C. Final Traffic Coating Inspection: Arrange for traffic coating manufacturer's technical personnel to inspect membrane installation on completion.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

- A. Protect traffic coatings from damage and wear during remainder of construction period.

- B. Clean spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foam plastic board insulation.
2. Mineral-wool board insulation.
3. Mineral-wool blanket insulation.
4. Spray polyurethane foam insulation.
5. High performance building insulation blanket.
6. Vapor retarders.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. This Section includes the following insulation uses:

1. Concealed building insulation.

D. Related Sections include the following:

1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Division 07 Section "Fire-Resistive Joint Systems" for insulation installed as part of a perimeter fire-resistive joint system.
5. Division 07 "Roofing Systems" for installation of insulation installed as part of a roof system.

1.2 DEFINITIONS

- ###### A. Mineral-Fiber Insulation:
- Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.
- D. Research/Evaluation Reports: For foam-plastic insulation, and thermal barrier, from ICC-ES.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Combustion Characteristics: ASTM E 136.
- C. Mockups: Provide thermal insulation for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
- D. Mockups: See Section 01 45 34 "Mockups" for mockups requiring thermal insulation.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
 - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
 - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation during inclement weather or when surfaces are moist.
- B. Do not install batt insulation in exterior wall assemblies until exterior sheathing has been installed and joints sealed in accordance with Division 07 Section "Sheathing", and air barrier has been fully applied to exterior face of sheathing in accordance with applicable Division 07 Section.
 - 1. Insulation that is exposed to moisture due to inadequate or compromised environmental protections, or that becomes wet or moist by other means subsequent to installation, shall be completely removed and discarded, and replaced with new materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Basis of Design Products: Provide the specified or indicated product or a comparable product by one of the other named manufacturers. Products must meet LEED performance requirements.

2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PERFORMANCE REQUIREMENTS

- A. Plenum Rating: Provide slag-wool-fiber/rock-wool-fiber insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181, or on comparable tests from another standard acceptable to authorities having jurisdiction.
1. Erosion Test Results: Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for 4 hours at 2500-fpm (13-m/s) air velocity.
 2. Mold Growth and Humidity Test Results: Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with Chaetomium globosum on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

2.3 LEED Performance Requirements

1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide interior insulation products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 3. Provide foam plastic board, sprayed foam and fibrous insulation products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
- B. Recycled Content:
1. Provide slag-wool-fiber/rock-wool-fiber insulation with recycled content so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.
 2. Provide polystyrene insulation with recycled content so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 10 percent.
- C. Formaldehyde Free: Provide formaldehyde-free products, or low emitting products that comply with LEED Performance Requirements in this Section.

2.4 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM roof membrane manufacturer, approved for use in FM Approvals' RoofNav-listed roof assemblies.
- B. Polyisocyanurate Board Insulation [**INS-1A**]: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. Compressive Strength: 20 psi (138 kPa).
2. Size: 48 by 48 inches (1219 by 1219 mm).
3. Thickness: As indicated on the Drawings.
 - a. Apply in two or more layers, with joints staggered.

- C. Tapered Insulation [**INS-1B**]: Provide factory-tapered insulation boards.
1. Material: Match roof insulation.
 2. Minimum Thickness: 1/4 inch (6.35 mm).
 3. Slope:
 - a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.5 ROOF INSULATION ACCESSORIES

- A. See Section 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for roof insulation accessories.

2.6 SLAG-WOOL-FIBER/ROCK-WOOL-FIBER BOARD INSULATION

- A. Basis of Design Manufacturer: Subject to compliance with requirements, provide Mineral-Wool Board Insulation products by Roxul, or comparable products by one of the following:
1. Fibrex Insulations Inc.
 2. Isolatek International.
 3. Owens Corning.
 4. Roxul Inc.
 5. Thermafiber.
- B. Unfaced, Mineral-Wool Board Insulation [**INS-2A**]: ASTM C 612, maximum ASTM E 85 flame-spread and smoke-developed indexes of 15 and 0, respectively; passing ASTM E 136 for combustion characteristics; and of the following nominal density and thermal resistivity:
1. Nominal density of 4.5 lb/cu. ft., Types IA and IB, thermal resistivity of 4.2 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C) Tested to ASTM C 518.
 2. Water absorption: 0.03% by volume, per ASTM C 1104.
 3. Linear Shrinkage: <2% 1200° F (650° C), per ASTM C 356.
 4. Applications: Rain-screen wall applications.
 - a. Roxul; Cavityrock.
 5. Application: Rain-screen walls.
- C. Unfaced, Mineral-Wool Board Insulation [**INS-2B**]: ASTM C 612; with maximum ASTM E 85 flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Nominal density of 8 lb/cu. ft. (128 kg/cu. m), Type III, thermal resistivity of 4.35 deg F x h x sq. ft./Btu x in. at 75 deg F (30.2 K x m/W at 24 deg C).
 2. Fiber Color: Darkened, where indicated.
 3. Applications: Curtain wall.
 - a. Roxul; Crutainrock 80.

- D. Unfaced Mineral-Wool Board, Types IA and IB, [**INS-2C**]: ASTM C 612, Types IA and IB; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 4 lb/cu. ft. (64 kg/cu. m).
1. Applications: Interior impaling pin installed; thermal and acoustical use.
 - a. Roxul; Rockboard 40.

2.7 MINERAL-WOOL BLANKET INSULATION

- A. Basis of Design Manufacturer: Subject to compliance with requirements, provide Mineral-Wool Blanket Insulation products by Roxul, or comparable products by one of the following:
1. Fibrex Insulations Inc.
 2. Owens Corning.
 3. Roxul Inc.
 4. Thermafiber.
- B. Unfaced, Mineral-Wool Blanket Insulation [**INS-3A**]: Specifically produced to provide fire containment between floors utilizing mineral fibers combined with thermosetting resins; complying with ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 0 and 0, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Density: 4.5 lbs/ft³ (72 kg/m³) minimum.
 2. Thickness: As scheduled.
 3. Acceptable Products:
 - a. Roxul Safe.
- C. Insulation [**INS-3B**]: Not used.
- D. Unfaced, Mineral-Wool Blanket Insulation [**INS-3C**]: Specifically produced to provide thermal resistance in metal framed walls, utilizing mineral fibers combined with thermosetting resins; complying with ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 0 and 0, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Density: 2 lbs/ft³ (34.2 kg/m³) minimum.
 2. Thickness: As scheduled.
 3. Acceptable Products:
 - a. Roxul Comfortbatt.

2.8 SPRAY POLYURETHANE FOAM INSULATION

- A. Basis of Design Manufacturer: Subject to compliance with requirements, provide Spray Polyurethane Insulation products by CertainTeed, or comparable products by one of the following:
1. BASF Corporation.
 2. BaySystems NorthAmerica, LLC.
 3. CertainTeed
 4. Dow Chemical Company (The).
 5. ERSystems, Inc.
 6. Gaco Western Inc.

7. Henry Company.
8. NCFI; Division of Barnhardt Mfg. Co.
9. SWD Urethane Company.
10. Volatile Free, Inc.

B. Closed-Cell Polyurethane Foam Insulation [**INS-4A**]: ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Minimum density of **1.5 lb/cu. ft.**, thermal resistivity of **6.2 deg F x h x sq. ft./Btu x in. at 75 deg F.**

C. Open-Cell Polyurethane Foam Insulation [**INS-4B**]: Spray-applied polyurethane foam using water as a blowing agent, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Minimum density of **0.4 lb/cu. ft.**, thermal resistivity of **3.4 deg F x h x sq. ft./Btu x in. at 75 deg F.**

2.9 THERMAL BARRIER COATING FOR SPRAY POLYURETHANE FOAM

A. 15-Minute Thermal Barrier for Spray Polyurethane Foam Insulation. A water-based, low VOC, intumescent latex paint.

1. Tested to NFPA 286 test standards and has been approved for use on spray foam insulation.
2. Thickness: As required to provide a 15-minute thermal barrier over spray applied polyurethane foam of thickness and density as applied.

2.10 HIGH PERFORMANCE BUILDING INSULATION BLANKET

A. High performance building insulation blanket **INSUL-5**: Insulation product with significantly improved thermal resistance as compared to conventional insulation products. Its thin profile, superb flexibility and compression resistance allow for thermal protection in hard to insulate spaces. R 9.8 (hr*ft²*F)/(BTU*in); U-value = 0.58 W/m²K per 25mm thickness, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84.

1. Product: Dow Corning® HPI-1000 Building Insulation Blanket, or accepted equal.
2. Application: Curtain Wall, parapet.

2.11 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
 - b. Gemco; Spindle Type.
 - c. Eckel Industries of Canada Limited; Stic-Klip Type N Fasteners.
2. Plate: Perforated galvanized carbon-steel sheet, **0.030 inch** thick by **2 inches** square.
3. Spindle: Copper-coated, low carbon steel; fully annealed; **0.105 inch** in diameter; length to suit depth of insulation indicated.

- B. Insulation-Retaining Washers: Self-locking washers formed from **0.016-inch-** thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than **1-1/2 inches** square or in diameter.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. AGM Industries, Inc.; RC150, or SC150.
 - b. Gemco; Dome-Cap, R-150, or S-150.
 - 2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawl spaces.
 - b. Ceiling plenums.
 - c. Attic spaces.
 - d. Where indicated.

- C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging air barrier, insulation, fasteners, and substrates.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. AGM Industries, Inc.; TACTOO Adhesive.
 - b. Gemco; Tuff Bond Hanger Adhesive.
 - c. Eckel Industries of Canada Limited; Stic-Klip Type S Adhesive.

2.12 VAPOR RETARDERS

- A. Fire-Retardant, Polyamide Film Vapor Retarders [**VR-2**]: polyamide film that changes its permeability with ambient humidity conditions and with flame-spread and smoke-developed indexes of not more than 25 and 450, respectively, per ASTM E 84.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. CertainTeed; MemBrain
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.
- D. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- E. Low-Expansion Detailing Foam Insulation: Fill gaps and voids between heads, jambs, and sills and their rough openings, at the following openings in exterior walls:
 - 1. Doors.
 - 2. Windows.
 - 3. Entrances and storefront.
 - 4. Curtain wall.
 - 5. Louvers.
 - 6. Through-wall penetrations.

3.4 INSTALLATION OF ROOF INSULATION

- A. See Section 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for installation of roof insulation.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain **3-inch** clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. For metal-framed wall cavities where cavity heights exceed **96 inches**, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- C. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.
- D. Thermal Barrier Coating: Apply thermal barrier coating to sprayed polyurethane foam unless covered by minimum 1/2-inch thick gypsum board, or other equivalent 15-minute thermal barrier.
1. Apply coating according to Manufacturer's instructions in thickness tested.
- E. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.
- 3.6 INSTALLATION OF INSULATION FOR CONCRETE AND GYPSUM SHEATHING SUBSTRATES
- A. Install board insulation on gypsum sheeting, concrete and concrete substrates masonry after application of air barrier. With temporary adhesive application, where insulation is retained by metal furring, or masonry tie attached retainers.
- B. Install board insulation on gypsum sheeting, concrete and concrete masonry substrates after application of air barrier where insulation is NOT retained by metal furring, or masonry tie attached retainers by adhesively attached, spindle-type insulation anchors as follows:
1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
 2. After adhesive has dried, and air barrier has been installed, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
 3. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- C. Thermal Spacer System:
1. Friction fit insulation in place as follows:
 - a. For semi-rigid insulation batts or boards, score or cut insulation down its centreline to 50 % maximum of its depth to enable fitting insulation in correct position.
 - b. Fold edges of insulation board back to enable friction fitting in correct position. Position edges of partially folded board into space between

- girts and thermal spacers, and flatten partially folded board against substrate.
- c. Ensure insulation is tightly fitted with sides of insulation slightly compressed at each insulation spacer.
- 2. Install insulation anchors 16 inches maximum on center along centerline of insulation batts or boards and in accordance with insulation manufacturer's written recommendations.
 - a. Use sufficient number of stick pins or retention devices to ensure insulation remains flat and in correct position.
 - b. Use 3 minimum stick pins or retention devices for each 4 feet long batt or board.
- 3. Ensure insulation pieces are in contact with no linear gaps between spacers.

3.7 INSTALLATION OF CURTAIN-WALL INSULATION

- A. Install board insulation in curtain-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.
 - 1. Retain insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.
 - 2. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system.
- B. Install High performance building insulation blanket in curtain-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.

3.8 INSTALLATION OF VAPOR RETARDERS

- A. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs.
 - 1. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners **16 inches (406 mm)** o.c.
 - 2. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
 - 3. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

- C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.9 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.10 INSULATION SCHEDULE

- A. Insulation Type INS-1A: Polyisocyanurate Board Roof Insulation, felt or glass-fiber mat facer on both major surfaces.
- B. Insulation Type INS-1B: Tapered Polyisocyanurate Board Roof Insulation, felt or glass-fiber mat facer on both major surfaces.
- C. Insulation Type INS-2A: Unfaced, slag-wool-fiber/rock-wool-fiber board insulation, 4.5 lb/cu. Ft density. For use in masonry veneer walls, rain-screen paneled walls and where indicated.
- D. Insulation Type INS-2B: Unfaced, slag-wool-fiber/rock-wool-fiber board insulation, 8 lb/cu. Ft density for use as glazed aluminum curtain wall insulation.
- E. Insulation Type INS-3A: Unfaced, slag-wool-fiber/rock-wool-fiber blanket insulation. For use in fire containment between floors.
- F. Insulation Type INS-3C: Unfaced, slag-wool-fiber/rock-wool-fiber blanket insulation. For use in exterior wall stud cavities.
- G. Insulation Type INS-4A: Closed-cell spray applied insulation. For use where indicated.
- H. Insulation Type INS-4B: Open-cell spray applied insulation. For use where indicated.
- I. Insulation Type INS-5: High performance building insulation blanket. For use in curtain wall.

END OF SECTION

SECTION 07 27 13

MODIFIED BITUMINOUS SHEET AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes self-adhering, vapor-retarding, modified bituminous sheet air barriers.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
 - 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PRECONSTRUCTION TESTING

- A. Preconstruction Compatibility and Adhesion Testing: Submit to air barrier manufacturers, for testing indicated below, samples of materials that will contact or affect air barriers and air barrier sealants.

1. Submit not fewer than eight pieces of each kind of material, including substrates, shims, backings, sealants and miscellaneous materials.
2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
3. For materials failing tests, obtain air barrier manufacturer's written instructions for corrective measures including use of specially formulated primers.
4. Testing will not be required if air barrier manufacturers submit data that are based on previous testing, not older than 24 months, of products for adhesion to, and compatibility with, substrates and other materials matching those submitted.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.

- e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For air-barrier assemblies.
- 1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 2. Include details of interfaces with other materials that form part of air barrier.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with air barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
 - 1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
- B. Mockups: Before beginning installation of air barrier, build mockups of exterior wall assembly incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.
 - 1. See Section 01 45 34 "Mockups For Exterior Wall Systems."
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

- B. Protect stored materials from direct sunlight.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
 - 1. Protect substrates from environmental conditions that affect air-barrier performance.
 - 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
- B. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. VOC Content: Limit VOC content of air barriers to 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa), when tested according to ASTM E 2357.

2.3 SELF-ADHERING SHEET AIR BARRIER

- A. Metal Faced Modified Bituminous Sheet [**AB-1**]: Self-adhering 40 mils membrane consisting of an SBS rubberized asphalt compound, integrally laminated to a glass scrim reinforced aluminum foil specifically designed to be self-adhered to a prepared substrate, providing an ultra violet light resistant weather barrier and formulated for application with primer that complies with VOC limits of authorities having jurisdiction.

1. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings & Waterproofing Inc. CCW 705FR-A.
 - b. Grace, W. R. & Co. - Conn; Perm-A-Barrier Aluminum Wall Membrane.
 - c. Henry Company; [Metal Clad](#).
2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.0002 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
 - b. Tensile Strength:
 - 1) Membrane: Minimum 400 psi (psi; ASTM D 412, Die C.
 - 2) Film: Minimum 5000 psi (250 psi (1.7 MPa); ASTM D 412, Die C.
 - c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.
 - d. Puncture Resistance: Minimum 40 lbf (180 N); ASTM E 154.
 - e. Water Absorption: Maximum 0.15 percent weight gain after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.
 - f. Vapor Permeance: Maximum 0.05 perm (2.9 ng/Pa x s x sq. m); ASTM E 96/E 96M, Water Method.

2.4 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier membrane.
- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.
- C. Metal Faced Flashing and Transition Strip: Self-adhering 40 mils membrane consisting of an SBS rubberized asphalt compound, integrally laminated to a glass scrim reinforced aluminum foil specifically designed to be self-adhered to a prepared substrate, providing an ultra violet light resistant weather barrier..
- D. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.
- E. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- F. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- G. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch (0.5 mm) thick, and Series 300 stainless-steel fasteners.
- H. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft. (24- to 32-kg/cu. m) density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- I. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 07 92 00 "Joint Sealants."

- J. Perimeter Transition Assembly to curtain wall: See Section 08 44 13 "Glazed Aluminum Curtain Walls."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that concrete has cured and aged for minimum time period recommended by air-barrier manufacturer.
 - 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
 - 1. Install modified bituminous strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch (1.6 mm).
- G. Bridge and cover isolation joints expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with overlapping modified bituminous strips.
- H. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- I. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 INSTALLATION

- A. General: Install modified bituminous sheets and accessory materials according to air-barrier manufacturer's written instructions and according to recommendations in ASTM D 6135.
 - 1. Apply Modified Bituminous Sheet [AB-1] at areas where the membrane will be completely covered within 30 days of installation and not be subject to incident light.
 - 2. Install High Temperature Sheet [AB-2] in locations where air barrier is located beneath rain-screen type coverings, metal roofing, flashing, or decorative metal fabrications.
- B. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
 - 1. Install modified bituminous strips centered over vertical inside corners. Install 3/4-inch (19-mm) fillets of termination mastic on horizontal inside corners.
- C. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D 6135.
- D. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.
 - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- E. Apply and firmly adhere modified bituminous sheets horizontally over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.
 - 1. Apply sheets in a shingled manner to shed water without interception by any exposed sheet edges.
 - 2. Roll sheets firmly to enhance adhesion to substrate.
- F. Apply continuous modified bituminous sheets over modified bituminous strips bridging substrate cracks, construction, and contraction joints.
- G. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- H. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.
 - 1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install modified bituminous strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate.
- I. Connect and seal exterior wall air-barrier membrane continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront

systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

- J. Wall Openings: Apply perimeter transition assembly according to manufacturer's instructions.
 - 1. Apply aluminum extrusions to perimeter of curtain wall and other penetrating elements.
 - 2. Seal and insert transition sheet and molded corners.
 - 3. Seal transition sheet and molded corners to each other and to the air barrier sheet.
 - 4. Seal edges of transition sheet and molded corners.
 - K. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier membrane with foam sealant.
 - L. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.
 - M. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
 - N. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches (150 mm) beyond repaired areas in all directions.
 - O. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
 - P. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.
- 3.4 FIELD QUALITY CONTROL
- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 - B. See Section 01 91 19 "Building Enclosure Commissioning" for building enclosure commissioning procedures and Section 01 91 19A "Building Enclosure Commissioning Appendix A" for building enclosure systems to be commissioned, and for Field Testing Requirements.
 - C. Air barriers will be considered defective if they do not pass inspections.
 - D. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 - E. Remove and replace deficient air-barrier components for retesting as specified above.
 - F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

3.5 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 30 days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
 - 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

- B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

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SECTION 07 42 13.13

FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exposed-fastener, lap-seam metal wall panels.
2. Perforated exposed-fastener, lap-seam metal wall and soffit panels.
3. Sheet metal panels fastened over existing windows at areaway.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification

C. Related Sections:

1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Section 05 40 00 "Cold Formed Metal Wall Framing" for backup wall framing, thermal spacer system and exterior furring.
5. Section 07 42 13.19 "Insulated Metal Wall Panels" for mineral wool insulated metal wall panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal panel assembly during and after installation.
8. Review of procedures for repair of metal panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- C. Shop Drawings:
 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than **1-1/2 inches per 12 inches (1:10)**.
 - D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
 1. Include Samples of trim and accessories involving color selection.
 - E. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:
 1. Metal Panels: **12 inches (305 mm)** long by actual panel width. Include fasteners, closures, and other metal panel accessories.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Delegated-Design Submittal:
 1. For metal wall panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - B. Qualification Data: For Installer, Testing Agency and Professional Engineer.
 - C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
 - D. Field quality-control reports.
 - E. Sample Warranties: For special warranties.
- 1.5 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For metal panels to include in maintenance manuals.
- 1.6 QUALITY ASSURANCE
- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
 - B. Testing: Where manufacturer's standard metal panel system complies with performance and test requirements and has been tested by an independent laboratory in accordance with the specified tests, provide test reports and certification by manufacturer showing compliance with such tests. Test reports shall not be older than five (5) years. When no tests exist, perform required tests through a recognized independent testing laboratory or agency and provide certified test report results.
 - C. Design Calculations: The metal panel fabricator/installer shall submit design calculations to substantiate performance requirements specified herein, prepared by, signed and sealed by a Structural (Professional) Engineer licensed in the State of Maine.

- D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical metal panel assembly as shown on Drawings or if not shown, build 100 sf. Minimum mockup, including corners, supports, attachments, and accessories.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Mockups: Provide formed metal wall panels for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
- F. Mockups: See Section 01 45 34 "Mockups" for mockups requiring formed metal panels.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Performance Requirements:
1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
 2. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - a. Wind Loads: As indicated.
 - b. Other Design Loads: As indicated on Drawings.
 - c. Seismic Design loads: As indicated on the Drawings.
 - d. Deflection Limits: For wind loads, no greater than 1/180 of the span.
 3. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - a. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- B. Metal panel cladding shall be designed to meet American Society of Civil Engineers (ASCE) 7-98 for enclosed buildings and in accordance with F M Global Data Sheet 1-28, Wind Design. Criteria should consider respective building heights, wind importance factor of 1.15, design wind speed of 95 mph, 3 second peak gust with a Ground Roughness Exposure C.
- C. Criteria for composite metal panel design, resist the following wind forces:
1. East Tower (102 ft. 10 in.): Inward and outward forces of 31.1 psf in the field (Zone 4), inward force of 31.1 psf in the corners (Zone 5) and an outward force of 56.9 psf in the corners of the wall.
 2. Stair Headhouse (113 in. 6 in.): Inward and outward forces of 31.7 psf in the field (Zone 4), inward force of 31.7 psf in the corners (Zone 5) and an outward force of 58.2 psf in the corners of the wall.

3. Elevator Hoistway (136 ft. 8 in.): Inward and outward forces of 33.0 psf in the field (Zone 4), inward force of 33.0 psf in the corners (Zone 5) and an outward force of 60.5 psf in the corners of the wall.
 4. East Tower Roof Screens (114 ft. 10 in.)
 5. East Tower Helipad Soffit (118 ft. 6 in.) horizontal soffit.
- D. General: Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
- E. Vee-Rib-Profile, Exposed-Fastener Metal Wall Panels [**MTL-4**]: Formed with raised, V-shaped ribs and recesses that are approximately same size, evenly spaced across panel width, and with rib/recess sides angled at approximately 45 degrees.
1. Manufacturer/Product: Subject to compliance with requirements, provide Morin; VB 31.
 2. Aluminum Sheet: Coil-coated sheet, **ASTM B 209 (ASTM B 209M)**, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - a. Thickness: 0.063 inches (1.60 mm).
 - b. Surface: Smooth, flat finish.
 - c. Exterior Finish [**EF-1**]: Two-coat fluoropolymer.
 - d. Color: Match Architect's sample.
 - e. Exterior Finish [**EF-2**]: Three-coat metallic fluoropolymer.
 - f. Color: As selected by the Architect from Industry standard colors.
- F. Vee-Rib-Profile, Exposed-Fastener Metal Wall and Soffit Panels [**MTL-5**]: Formed with raised, V-shaped ribs and recesses that are approximately same size, evenly spaced across panel width, and with rib/recess sides angled at approximately 45 degrees.
1. Manufacturer/Product: Subject to compliance with requirements, provide Morin; VB 31.
 2. Aluminum Sheet: Coil-coated sheet, **ASTM B 209 (ASTM B 209M)**, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
 - a. Thickness: 0.063 inches (1.60 mm).
 - b. Surface: Smooth, flat finish.
 - c. Perforations: 40% perforation, as selected from Manufacturer's available patterns.
 - d. Exterior Finish [**EF-1**]: Two-coat fluoropolymer.
 - e. Color: Match Architect's sample.
- G. Sheet metal panels fastened over existing windows at areaway: Flat panels formed with s-locked joints, and exposed fasteners.
1. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, **G90 (Z275)** coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, **Class AZ50 (Class AZM150)** coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Nominal Thickness: **0.052 inch (1.32 mm)**.

2.2 MISCELLANEOUS MATERIALS

- A. Thermal Support System: See Section 05 40 00 "Cold Formed Metal Framing."
- B. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, **G90 (Z275 hot-dip galvanized)** coating designation or ASTM A 792/A 792M, **Class AZ50 (Class AZM150)** aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- C. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 - 2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum **1-inch- (25-mm-)** thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- D. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- E. Copings: Provide copings at locations where formed metal wall panels extend to the top of walls. See Section 07 62 00 for coping requirements.
 - 1. Color: Match adjacent metal panels.
- F. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM sealing washers for exposed fasteners.
 - 1. Material: Stainless-steel, Type 316.
- G. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch (13 mm)** wide and **1/8 inch (3 mm)** thick.
 - 2. Joint Sealant: ASTM C 920; elastomeric silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.3 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.4 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Aluminum Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as metal panel work proceeds.
 - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 - 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:

1. Steel Panels: Use stainless-steel fasteners Type 316, for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
 - C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
 - D. Lap-Seam Exposed Fastener Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
 1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat enclosure.
 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 5. Flash panels at perimeter of all openings.
 - E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
 - F. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
 1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of **10 feet (3 m)** with no joints allowed within **24 inches (610 mm)** of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with mastic sealant (concealed within joints).
- 3.4 FIELD QUALITY CONTROL
- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.

- B. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 07 42 13.19

INSULATED METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mineral Wool-insulation-core metal wall panels.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 07 42 13.13 "Formed Metal Wall Panels" for exposed and concealed fastener metal panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.

5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal panel assembly during and after installation.
8. Review procedures for repair of metal panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- C. Shop Drawings:
 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than **1-1/2 inches per 12 inches (1:10)**.

- D. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below.
 - 1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.4 INFORMATIONAL SUBMITTALS

- A. Delegated-Design Submittal:
 - 1. For metal wall panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Qualification Data: For Installer, Testing Agency and Professional Engineer.
- C. Product Test Reports: For each product, tests performed by a qualified testing agency.
- D. Field quality-control reports.
- E. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing: Where manufacturer's standard metal panel system complies with performance and test requirements and has been tested by an independent laboratory in accordance with the specified tests, provide test reports and certification by manufacturer showing compliance with such tests. Test reports shall not be older than five (5) years. When no tests exist, perform required tests through a recognized independent testing laboratory or agency and provide certified test report results.
- C. Design Calculations: The metal panel fabricator/installer shall submit design calculations to substantiate performance requirements specified herein, prepared by, signed and sealed by a Structural (Professional) Engineer licensed in the State of Maine.
- D. Mockups: Provide insulated metal panels for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
- E. Mockups: See Section 01 45 34 "Mockups" for mockups requiring insulated metal panels.
 - 1. DELIVERY, STORAGE, AND HANDLING

- F. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- G. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- H. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- I. Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 72:
 - 1. Wind Loads: As indicated.
 - 2. Seismic Loads: As indicated on the Drawings.
 - 3. Other Design Loads: As indicated on Drawings.
 - 4. Deflection Limits: For wind loads, no greater than 1/180 of the span.

- C. Metal panel cladding shall be designed to meet American Society of Civil Engineers (ASCE) 7-98 for enclosed buildings and in accordance with F M Global Data Sheet 1-28, Wind Design. Criteria should consider respective building heights, wind importance factor of 1.15, design wind speed of 95 mph, 3 second peak gust with a Ground Roughness Exposure C.
- D. Criteria for metal panel design, resist the following wind forces:
1. East Tower (102 ft. 10 in.): Inward and outward forces of 31.1 psf in the field (Zone 4), inward force of 31.1 psf in the corners (Zone 5) and an outward force of 56.9 psf in the corners of the wall.
 2. Stair Headhouse (113 in. 6 in.): Inward and outward forces of 31.7 psf in the field (Zone 4), inward force of 31.7 psf in the corners (Zone 5) and an outward force of 58.2 psf in the corners of the wall.
 3. Elevator Hoistway (136 ft. 8 in.): Inward and outward forces of 33.0 psf in the field (Zone 4), inward force of 33.0 psf in the corners (Zone 5) and an outward force of 60.5 psf in the corners of the wall.
- E. Air Infiltration: Air leakage of not more than 0.001 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:
1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- F. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
1. Test-Pressure Difference: 12 lbf/sq. ft..
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- H. Fire-Test-Response Characteristics: Provide metal wall panels and system components with the following fire-test-response characteristics, as determined by testing identical panels and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
1. Fire-Resistance Characteristics: Provide materials and construction tested for fire resistance per ASTM E 119.
 2. Intermediate-Scale Multistory Fire Test: Tested mockup, representative of completed multistory wall assembly of which wall panel is a part, complies with NFPA 285 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies.
 3. Radiant Heat Exposure: No ignition when tested according to NFPA 268.
 4. Potential Heat: Acceptable level when tested according to NFPA 259.
 5. Surface-Burning Characteristics: Provide wall panels with a flame-spread index of zero and a smoke-developed index of zero, per ASTM E 84.

2.2 LEED Performance Requirements

1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
2. Provide interior insulation products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
3. LEED Requirements: Provide fibrous insulation products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

2.3 MINERAL WOOL-INSULATION-CORE METAL WALL PANELS

- A. General: Provide factory-formed and -assembled metal wall panels fabricated from two metal facing sheets and core material laminated or otherwise securely bonded to facing sheets during fabrication without use of contact adhesives, and with joints between panels designed to form weathertight seals. Include accessories required for weathertight installation.
- B. F M Global Approval: Provide insulated metal panels approved and listed by F M Global.
- C. Concealed-Fastener, Mineral Wool-Insulation-Core Metal Wall Panels [**MTL-3**]: Formed with tongue-and-groove panel edges; designed for sequential installation by interlocking panel edges and mechanically attaching panels to supports using concealed clips or fasteners.
 1. Basis of Design Manufacturer: Subject to compliance with requirements, provide Centria; Formashield fire-rated insulated metal wall panels, or comparable product by of the following:
 - a. Centria.
 - b. Kingspan
 - c. MBCI.
 - d. Metl-Span.
 2. Metallic-Coated Steel Sheet: Facings of zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, **G90 (Z275)** coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, **Class AZ50 (Class AZM150)** coating designation; structural quality.
 - a. Nominal Thickness: **0.034 inch (0.86 mm)**.
 3. Insulation Core: Manufacturer's standard mineral wool board, with maximum flame-spread and smoke-developed indexes of zero and zero, respectively.
 - a. R value: 3.6 per inch, per ASTM C518.
 4. Panel Joints: Double tongue and groove, interlocking rain-screen joint.
 5. Vertical reveal trim battens: Same material, finish, as exterior facings of wall panels.
 6. Panel Coverage: 42 inches nominal.
 7. Panel Thickness: 8 inches.
 8. Thermal-Resistance Value (R-Value): 28.8 according to ASTM C 1363.
 9. Fire-resistance: 8" panel thickness = 3 hours according to ASTM E119.

2.4 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 2. Joint Sealant: ASTM C 920; 100% elastomeric silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.
- F. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.

2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Mineral Wool Core Wall Panels: Fabricate panels using manufacturer's standard thermosetting structural adhesive in a lamination process that bonds panel under minimum 10-psi (69-kPa) pressure.
 - 1. Panel Bow Tolerance: Not more than 0.5 percent of panel width or length.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as metal panel work proceeds.
 - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 - 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fastening: fasten in accordance with F M Global Approval listing.
- C. Fasteners:
 - 1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weathertight performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated by metal panel manufacturer; or, if not indicated, provide types recommended by metal wall panel manufacturer.
 - 1. Seal metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

3.4 INSULATED METAL WALL PANEL INSTALLATION

- A. General: Apply continuous ribbon of sealant to panel joint on concealed side of insulated metal wall panels as vapor seal; apply sealant to panel joint on exposed side of panels for weather seal.

1. Fasten insulation-core metal wall panels to supports with fasteners at each lapped joint at location and spacing and with fasteners recommended by manufacturer.
 2. Apply panels and associated items true to line for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
 3. Provide metal-backed washers under heads of exposed fasteners on weather side of insulated metal wall panels.
 4. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 5. Provide sealant tape at lapped joints of insulated metal wall panels and between panels and protruding equipment, vents, and accessories.
 6. Apply a continuous ribbon of sealant tape to panel side laps and elsewhere as needed to make panels weathertight.
 7. Apply vertical reveal trim battens to insulated-core metal wall panel seams.
- B. Laminated-Insulation-Core Metal Wall Panels:
1. Wrapped-Edge Panels: Mechanically attach wall panels through extended edge of panels to supports using self-tapping fasteners. Seal joints with manufacturer's standard gaskets.
- C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
- D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of **10 feet (3 m)** with no joints allowed within **24 inches (610 mm)** of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with mastic sealant (concealed within joints).
- ### 3.5 FIELD QUALITY CONTROL
- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.

- C. See Section 01 91 19 "Building Enclosure Commissioning" for building enclosure commissioning procedures and Section 01 91 19A "Building Enclosure Commissioning Appendix A" for building enclosure systems to be commissioned, and for Field Testing Requirements.
- D. Metal wall panels will be considered defective if they do not pass test and inspections.
- E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- D. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of insulated metal panels immediately after installation, and apply repair paint.

END OF SECTION

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SECTION 07 42 13.23

METAL COMPOSITE MATERIAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes metal composite material panels.
 - 1. Exterior wall panels.
 - 2. Exterior soffit panels.
 - 3. Copings.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
 - 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 4. Section 05 40 00 "Cold Formed Metal Framing" for thermal support system.
 - 5. Section 07 42 13 "Formed Metal Wall Panels."

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- C. Shop Drawings:
1. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
 2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches (1:10).
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Metal Composite Material Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other metal composite material panel accessories.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Product Test Reports: For each product, tests performed by a qualified testing agency.
 - C. Evaluation Reports: For Metal Composite Material Wall Panels, from ICC-ES.
 - D. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested and FM Approvals approved.
 - E. Delegated Design: The metal panel fabricator/installer shall submit design calculations to substantiate performance requirements specified herein, prepared by, signed and sealed by a Structural (Professional) Engineer licensed in the State of Maine.

- F. Field quality-control reports.
- G. Sample Warranties: For special warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal composite material panels to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Provide metal composite material panels for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
- C. Mockups: See Section 01 45 34 "Mockups" for mockups requiring metal composite material wall panels.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.
- B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal composite material panels during installation.

1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:
 - 1. Wind Loads: As indicated.
 - 2. Seismic Loads: As indicated on Drawings.
 - 3. Other Design Loads: As indicated on Drawings.
 - 4. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Metal panel cladding shall be designed to meet American Society of Civil Engineers (ASCE) 7-98 for enclosed buildings and in accordance with F M Global Data Sheet 1-28, Wind Design. Criteria should consider respective building heights, wind importance factor of 1.15, design wind speed of 95 mph, 3 second peak gust with a Ground Roughness Exposure C.
- C. Criteria for metal panel design, resist the following wind forces:
 - 1. East Tower (102 ft. 10 in.): Inward and outward forces of 31.1 psf in the field (Zone 4), inward force of 31.1 psf in the corners (Zone 5) and an outward force of 56.9 psf in the corners of the wall.
 - 2. Stair Headhouse (113 in. 6 in.): Inward and outward forces of 31.7 psf in the field (Zone 4), inward force of 31.7 psf in the corners (Zone 5) and an outward force of 58.2 psf in the corners of the wall.
 - 3. Elevator Hoistway (136 ft. 8 in.): Inward and outward forces of 33.0 psf in the field (Zone 4), inward force of 33.0 psf in the corners (Zone 5) and an outward force of 60.5 psf in the corners of the wall.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- E. Fire Performance:
 - 1. Metal composite material wall panel system passes NFPA 285 testing as part of an approved assembly, consistent with the building construction as designed.

2. Metal composite material passes ASTM E 84 with Max. Flame Spread 25, Max. Smoke Developed 450

F. LEED Requirements: Provide metal composite material products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

G. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification that matched the classification of the roof installed on or above. Identify materials with name of fabricator and design approved by FM Approvals.

1. Copings and roof edge flashings: Designed and installed in accordance with Data Sheet 1-49, Perimeter Flashing.

2.2 METAL COMPOSITE MATERIAL WALL PANELS

A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded fire-retardant core; formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.

1. Manufacturers/Products:

a. Subject to compliance with the requirements, provide 3A Composites; Alucobond Plus Rainscreen II.

B. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch- (0.50-mm-) thick, anodized aluminum sheet facings.

1. Panel Thickness: 0.157 inch (4 mm).
2. Core: Fire retardant.

C. Attachment Assembly Components: Formed from extruded aluminum.

D. Attachment Assembly: Subgirt and spline Rainscreen principle system.

1. Color: Exposed components match patch panel face.

E. Metal Composite Material Copings: See Section 07 62 00 "Sheet Metal Flashings and Trim" for performance requirements.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.

- C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal composite material panels and remain weathertight; and as recommended in writing by metal composite material panel manufacturer.

2.4 FABRICATION

- A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Fabricate metal composite material panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements, where indicated.
- C. Fabricate metal composite material panel joints with field installed sealant that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements, where indicated.
- D. Fabricate metal composite material panel joints with drained back rainscreen metal wall panel system without use of sealants, gaskets, or butyl tape, tested as installed in compliance with AAMA 509.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Color Anodic Finish: Finish for visible components of support system: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 1. Colors: Black
- D. High-Performance Organic Finish for Interior Material: Where indicated provide Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 1. Color and Gloss: Match Architect's sample.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.
 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal composite material wall panel manufacturer.
 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.

3.3 METAL COMPOSITE MATERIAL PANEL INSTALLATION

- A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Shim or otherwise plumb substrates receiving metal composite material panels.
 2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistant barriers and flashings that will be concealed by metal composite material panels are installed.
 3. Install screw fasteners in predrilled holes.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Install flashing and trim as metal composite material panel work proceeds.
 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
 1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.
- D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
- E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.
 1. Rainscreen Systems: Do not apply sealants to joints unless otherwise indicated.

- F. Copings: Install in accordance with Data Sheet 1-49, Perimeter Flashing.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
 - 1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (605 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. See Section 01 45 36 "Performance Testing for Exterior."
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal composite material wall panel installation, including accessories.
- D. Metal composite material wall panels will be considered defective if they do not pass test and inspections.
- E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.

- B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 53 23

ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered ethylene-propylene-diene-terpolymer (EPDM) roofing system.
2. Substrate board.
3. Vapor retarder.
4. Roof insulation.
5. Cover board.
6. Walkways.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Sections 01 91 19 "Building Enclosure Commissioning" and 01 91 19A "Building Enclosure Commissioning Appendix A" for commissioning of roofing system.
4. Section 06 10 53 "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
5. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
6. Section 07 71 00 "Roof Specialties" for manufactured copings.
7. Section 07 72 00 "Roof Accessories" for manufactured roof curbs.
8. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
9. Division 07 Section "Expansion Control" for roof expansion joints.
10. Section 22 14 23 "Storm Drainage Piping Specialties" for roof drains.

1.2 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site.
 1. Meet with Owner, Architect, Construction Manager, Owner's insurer, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:

- 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
- C. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
1. Outline of each roof or roof area, number for reference, showing the location and type of all penetrations, location of and type of seams and keyed locations for all details, height and dimensions of each labeled roof area, and the dimensions and locations of all perimeter and corner areas.
 - a. Orientation of steel roof deck and orientation of roof membrane and fastening spacings.
 2. Base flashings and membrane terminations.
 - a. Indicate complete installation details of roofing and flashing, including roof slopes, flashing details, penetration details and accessories.
 - b. Furnish project-specific details; manufacturer's standard pre-printed details will not be acceptable Shop Drawings.
 3. Substrate slopes.
 4. Vapor retarder and membrane terminations.
 5. Tie-in with air barrier.
 6. Tapered insulation, including thickness and slopes.
 7. Drain sumps, including slopes.
 8. Insulation Crickets, Saddles and Tapered System: Shop drawings showing layout, dimensions, slopes, details and method of attachment to substrate.
 9. Insulation fastening patterns for corner, perimeter, and field-of-roof locations necessary to satisfy windstorm classification rating specified.
 10. Perimeter and penetration details, including methods of attachment, additional membrane securement bars and strips, splices, sizes, spacing and types of all anchors and fasteners.
 11. Walkways: Shop drawings of each roof or roof area showing the layout and pattern of walkways.
 12. Show all roof mounted equipment, projections and penetrations.
- D. Samples for Verification: For the following products:
1. Sheet roofing, of color specified, including T-shaped side and end lap seam, 12-by-12-inch(300-by-300-mm) square .
 2. Roof insulation, 12-by-12-inch(300-by-300-mm) square.
 3. Metal termination bars, 12 inch long.
 4. Six insulation fasteners of each type, length, and finish.

5. Walkway pads or rolls, of color required.

E. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of complying with performance requirements.
2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
3. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

C. Product Test Reports: For components of roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

D. FM Global Form 2688, Checklist for Roofing System, for each new roof assembly. The Form 2688 shall include a RoofNav Assembly number and contain all the materials utilized in the roofing project. Exact trade names of the materials being utilized shall be stated along with the proposed fastening rates and insulation thicknesses.

E. Evaluation Reports: For components of roofing system, from ICC-ES.

F. Field Test Reports:

1. Concrete internal relative humidity test reports.
2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

G. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

B. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1. Field Seams: After installation is completed, submit 2 copies of inspection and testing report prepared by the single ply membrane manufacturer and countersigned by the applicator, outlining the testing and inspection

- procedures and attesting to the fact that the single ply membrane field seams including the expansion joints, were 100% inspected and tested.
2. Fastener Pull-Out Tests: After installation is completed, submit 2 copies of test report, outlining test procedures, test results and remedial actions taken, if required.
 3. Water Tests: After installation is completed, submit 2 copies of test report, outlining test procedures, test results and remedial actions taken, if required.
 4. Thermal Imagery: Perform thermal imaging study and report according to ASTM C-1153 "Location of Wet Insulation in Roofing Systems Using Infrared Imaging."
- C. Manufacturer's Acceptance Certification: Upon completion of the Work submit a written certified statement signed by the manufacturer stating that the field supervision by the manufacturer's representative was sufficient to insure proper application of the materials, that the Work was installed in accordance with the Contract Documents and that the installation is acceptable to the manufacturer and in compliance with specified warranty requirements.
- D. Maintenance Manuals: For roofing system to include in the maintenance manuals, submit two (2) sets of manufacturer's printed instructions and recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.
- E. Warranty: Copy of executed warranty stating obligations, remedies, limitations, and exclusions of warranty.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is listed in FM Approvals' RoofNav for roofing system identical to that used for this Project.
- B. Installer Qualifications: Engage an experienced installer, with 5 years successful experience on projects of comparable size and scope to this Project, to perform work of this Section and who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with

insulation manufacturer's written instructions for handling, storing, and protecting during installation.

- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Emergency Equipment: Maintain on-site equipment necessary to apply emergency temporary edge seal in the event of sudden storms or inclement weather.
- C. Coordinate between various trades to avoid unnecessary rooftop traffic over sections of the roof and to prevent damage to the membrane. Heavily traveled areas shall be protected by placing temporary protection courses to prevent damage to the membrane.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, vapor barrier walkway products, and other components of membrane roofing system.
 - a. Section 07 71 00 Roof Specialties: Copings.
 - b. Section 07 72 00 Roof Accessories: Roof curbs.
 - 2. Include agreement to maintain roof and base flashing in a watertight condition for period of warranty. Warranty coverage shall include:
 - a. Base ply materials, fasteners and adhesives.
 - b. Roof membrane components and adhesives.
 - c. All accessory products required for installation of membrane roofing system, including flashing plies and vapor retarder.
 - d. Roof insulation, substrate boards, cover boards, and fasteners.
 - 3. Warranty shall not exclude coverage as a result of winds of 90 m.p.h. or less.
 - 4. Warranty Period: 15 years from date of Substantial Completion.
- B. Special Warranty for Polyisocyanurate Insulation: Upon completion of the work, provide polyisocyanurate insulation manufacturer's twenty (20) year warranty stating that the thermal resistance of the insulation shall not vary more than 20% from its published value. Upon notification of such defects, within the warranty period, make the necessary repairs or replacements, including cost of materials and labor, at the convenience of the Owner.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and flashings shall remain watertight.
1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272, or the Resistance to Foot Traffic Test in FM Approvals 4470.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
1. East Tower: Minimum ratings of 105 lbf/sq. ft. in the field, and 150 lbf/sq. ft. in the "L" shaped corners.
 2. Stair Headhouse: 105 lbf/sq. ft. in the field, 150, lbf/sq. ft. 4 ft. perimeter and 210 lbf/sq. ft. "L" shaped corners.
 3. Elevator Hoistway: 105 lbf/sq. ft. in the field, 165, lbf/sq. ft. 4 ft. perimeter and 210 lbf/sq. ft. "L" shaped corners.
- D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
1. Hail-Resistance Rating: SH.
 2. RoofNav:
 - a. East Tower Concrete deck: FM Roof Nav # 297159-0-0
 - b. Stair Headhouse and Elevator Hoistway Metal Deck: FM Roof Nav # 319880-0-0 (1A-225)
- E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 ETHYLENE-PROPYLENE-DIENE-TERPOLYMER (EPDM) ROOFING

- A. EPDM Sheet: ASTM D 4637/D 4637M, Type I, nonreinforced, EPDM sheet with factory-applied seam tape.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Firestone Building Products.
 2. Thickness: 60 mils (1.5 mm), nominal.
 3. Exposed Face Color: Black.
 4. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.
- B. Self-Adhering EPDM Sheet: ASTM D 4637/D 4637M, Type I, nonreinforced, self-adhering EPDM sheet with factory-applied seam tape.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Firestone Building Products.
 2. Thickness: 60 mils (1.5 mm), nominal, with preapplied contact adhesive, and release sheet.
 3. Exposed Face Color: Black.
 4. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.
- C. Roofing System Assemblies: Provide the following roofing system assemblies complete with adhesives, fasteners and accessories to comply with performance criteria:
1. Main Roof [**RF-1**]: East Tower Roof: required uplift pressures are 105/150/210 psf for field/ perimeter/ corner areas:
 - a. Walkways: Where indicated, adhered.
 - b. New Construction
 - c. Min. 3,000 psi structural concrete roof deck
 - d. Firestone V-Force Vapor Barrier & SA-LVOC Primer
 - e. Firestone ISO 95+ GL adhered in Firestone Insulation Adhesive @ 12" o.c. bead spacing
 - f. 1/2 inch Securock Gypsum Fiber or DensDeck Prime adhered in Firestone Insulation Adhesive @ 12" o.c. bead spacing
 - g. Firestone .060 EPDM adhered in LVOC Bonding Adhesive
 - h. FM RoofNav # 297159-0-0 meets 525 psf
 2. Elevator Head House Stair & Hoistway Roofs [**RF-2**]: Required uplift pressures are 105/150/210 psf (Stair) and 105/165/210 (Hoistway):
 - a. New Construction
 - b. Min. 22 ga. steel deck
 - c. 5/8 inch DensDeck
 - d. Firestone V-Force Vapor Barrier & SA-LVOC Primer
 - e. Firestone ISO 95+ GL screwed to steel deck at a rate of 20/32/32 for field/ perimeter/ corner areas
 - f. 1/2 inch DensDeck Prime adhered in in Firestone Insulation Adhesive @ 6/4/4" o.c. bead spacing for field/ perimeter/ corner areas
 - g. Firestone 060 EPDM adhered in LVOC Bonding Adhesive
 - h. FM RoofNav # 319880-0-0 (1A-225)
 3. Richards Connection 7th level areaway interior Roof [**RF-3**]: Interior covered areaway roof, no wind load.
 - a. New Construction
 - b. Min. 22 ga. steel deck
 - c. 5/8 inch DensDeck, fastened.

- d. Firestone V-Force Vapor Barrier & SA-LVOC Primer
- e. Insulation: Tapered mineral fiber, fastened.
- f. 1/2 inch DensDeck Prime, fastened.
- g. EPDM Membrane: 0.60 inches: Self-Adhering.
- h. FM RoofNav: None, no exterior exposure.

2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
 - 1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
 - 2. Adhesives and sealants shall comply with the following limits for VOC content:
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesives: 80 g/L.
 - f. PVC Welding Compounds: 510 g/L.
 - g. Other Adhesives: 250 g/L.
 - h. Single-Ply Roof Membrane Sealants: 450 g/L.
 - i. Nonmembrane Roof Sealants: 300 g/L.
 - j. Sealant Primers for Nonporous Substrates: 250 g/L.
 - k. Sealant Primers for Porous Substrates: 775 g/L.
 - 3. Adhesives and sealants shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.
- C. Slip Sheet: Manufacturer's standard, of thickness required for application.
- D. Prefabricated Pipe Flashings: As provided by or recommended by roof membrane manufacturer.
- E. Bonding Adhesive: Manufacturer's standard, low VOC.
- F. Seaming Material: Factory-applied seam tape, width as recommended by manufacturer.
- G. Seaming Overlay Strip: 75 mill semi-cured EPDM laminated to fully cured synthetic rubber pressure-sensitive adhesive.
- H. Corners: Flashed with T-joint cover and 9 inch Corner Flashing.
- I. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
- J. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

- K. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- L. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer.
- M. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
 - 1. Provide white flashing accessories for white EPDM membrane roofing.

2.4 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
 - 1. Thickness: Type X, 5/8 inch (16 mm).
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

2.5 VAPOR RETARDER

- A. Self-Adhering-Sheet Vapor Retarder: SBS modified bitumen adhesive, factory laminated to a tri-laminate woven, high-density polyethylene top surface. A polymeric release liner protects the adhesive. Provide primer when recommended by vapor retarder manufacturer.

2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM roof membrane manufacturer, approved for use in FM Approvals' RoofNav-listed roof assemblies.
- B. See Section 07 21 00 for Roof Insulation.

2.7 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
- C. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
 - 1. Thickness: 1/2 inch (13 mm).
 - 2. Surface Finish: Factory primed.

- D. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric; water permeable and resistant to UV degradation; type and weight as recommended by roofing system manufacturer for application.

2.8 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately **3/8 inch** thick and acceptable to roofing system manufacturer.
 - 1. Size: Approximately **30 by 30 inches**.
 - 2. Attachment: Pressure-Sensitive Molded Walkway Pads.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 05 31 00 "Steel Decking."
 - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 - 5. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer when tested according to ASTM F 2170.
 - a. Test Frequency: One test probe per each **1000 sq. ft. (93 sq. m)**, or portion thereof, of roof deck, with not less than three test probes.
 - b. Submit test reports within 24 hours of performing tests.
 - 6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified under Division 07 "Air Barrier" Section.

3.4 SUBSTRATE BOARD INSTALLATION

- A. Install substrate board on metal decks with long joints in continuous straight lines, with end joints staggered not less than **24 inches (610 mm)** in adjacent rows.
 - 1. At steel roof decks, install substrate board at right angle to flutes of deck.
 - a. Locate end joints over crests of steel roof deck.
 - 2. Tightly butt substrate boards together.
 - 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 4. Fasten substrate board to top flanges of steel deck according to recommendations in FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.

3.5 VAPOR RETARDER INSTALLATION

- A. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of **3-1/2 and 6 inches (90 and 150 mm)**, respectively.
 - 1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
 - 2. Seal laps by rolling.
- B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.6 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Concrete Decks:
 - 1. Install base layer of insulation with end joints staggered not less than **12 inches (305 mm)** in adjacent rows.

- a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than **1/4 inch (6 mm)** in width.
 - c. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches (610 mm)**.
 - 1) Trim insulation so that water flow is unrestricted.
 - d. Fill gaps exceeding **1/4 inch (6 mm)** with insulation.
 - e. Cut and fit insulation within **1/4 inch (6 mm)** of nailers, projections, and penetrations.
 - f. Adhere base layer of insulation to vapor retarder according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than **12 inches (305 mm)** from previous layer of insulation.
- a. Staggered end joints within each layer not less than **12 inches (156 mm)** in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than **1/4 inch (6 mm)** in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches (610 mm)**.
 - 1) Trim insulation so that water is unrestricted.
 - e. Fill gaps exceeding **1/4 inch (6 mm)** with insulation.
 - f. Cut and fit insulation within **1/4 inch (6 mm)** of nailers, projections, and penetrations.
 - g. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
- D. Installation Over Metal Decking:
1. Install base layer of insulation with joints staggered not less than **24 inches (610 mm)** in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Locate end joints over crests of decking.
 - b. Installing insulation in two or more layers.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than **1/4 inch (6 mm)** in width.

- e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches (610 mm)**.
 - 1) Trim insulation so that water flow is unrestricted.
 - f. Fill gaps exceeding **1/4 inch (6 mm)** with insulation.
 - g. Cut and fit insulation within **1/4 inch (6 mm)** of nailers, projections, and penetrations.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than **12 inches (305 mm)** from previous layer of insulation.
- a. Staggered end joints within each layer not less than **24 inches (610 mm)** in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than **1/4 inch (6 mm)** in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches (610 mm)**.
 - e. Trim insulation so that water flow is unrestricted.
 - f. Fill gaps exceeding **1/4 inch (6 mm)** with insulation.
 - g. Cut and fit insulation within **1/4 inch (6 mm)** of nailers, projections, and penetrations.
 - h. Mechanically attach insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

3.7 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of **6 inches (150 mm)** in each direction.
1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
 3. Cut and fit cover board tight to nailers, projections, and penetrations.
 4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.8 ADHERED ROOFING INSTALLATION

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

- B. Unroll membrane roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel and Owner's testing and inspection agency.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeters.
- G. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- H. Factory-Applied Seam Tape Installation: Clean and prime surface to receive tape.
 - 1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
 - 2. Apply lap sealant and seal exposed edges of roofing terminations.
- I. Leave seams uncovered until inspected by testing agency.
- J. Seaming Overlay Strip: Apply seam overlay strip to all seams. Clean and prime face of splice areas, firmly roll side laps.
- K. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- L. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.9 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.10 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products according to manufacturer's written instructions.
 - 1. Install flexible walkways at the following locations:
 - a. Perimeter of each rooftop unit.
 - b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - d. Top and bottom of each roof access ladder.
 - e. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 - f. Locations indicated on Drawings.
 - g. As required by roof membrane manufacturer's warranty requirements.
 - 2. Provide **6-inch (76-mm)** clearance between adjoining pads.
 - 3. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- B. Envelope Commissioning: See Section 01 91 19 "Building Enclosure Commissioning" for commissioning and Section 01 91 19A "Building Enclosure Commissioning Appendix A" for Building Enclosure Systems to be commissioned and for Field Testing Requirements.
- C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

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SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formed Low slope roofing fabrications.
2. Formed wall sheet metal fabrications.
3. Formed equipment support flashing.
4. Formed helipad gutters and downspouts.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
2. Section 01 81 13 "Sustainable Design Requirements - LEED v4 for Building Design & Construction - New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
5. Division 07 Section "Formed Metal Wall Panels" for copings provided by that Section.
6. Division 07 Section "Expansion Control" and "Manufactured Roof Expansion Joints for manufactured sheet metal expansion-joint covers.
7. Division 07 Section "Roof Specialties" for copings.
8. Division 07 Section "Roof Accessories" for curbs.
9. Division 26 Sections for helipad gutter heat trace.

1.2 COORDINATION

- ###### A.
- Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
 - 3. Review requirements for insurance and certificates if applicable.
 - 4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- A. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.

- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
1. Include plans, elevations, sections, and attachment details.
 2. Provide F M Global approved details.
 3. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
 4. Include identification of material, thickness, weight, and finish for each item and location in Project.
 5. Include details for forming, including profiles, shapes, seams, and dimensions.
 6. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 7. Include details of termination points and assemblies.
 8. Include details of roof-penetration flashing.
 9. Include details of edge conditions, including counterflashings as applicable.
 10. Include details of special conditions.
 11. Include details of connections to adjoining work.
 12. Detail formed flashing and trim at scale of not less than 1:5 (3 inches per 12 inches).
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
 2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.
 3. Accessories and Miscellaneous Materials: Full-size Sample.
 4. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
 5. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.5 INFORMATIONAL SUBMITTALS

- A. Delegated-Design Submittal: For Roof edge and coping wood nailer system, indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Qualification Data: For qualified fabricator, and engineer.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested and FM Approvals approved.
- E. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.
- C. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- D. Mockups: Provide sheet metal flashing and trim for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
- E. Mockups: See Section 01 45 34 "Mockups" for mockups requiring sheet metal flashing and trim.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of flashings in conjunction with waterproofing mockups.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Low slope roofing flashings are included in the Roofing Warranty, See Division 07 Roofing Sections.

- B. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification that matched the classification of the roof installed on or above. Identify materials with name of fabricator and design approved by FM Approvals.
 - 1. Copings and roof edge flashings: Designed and installed in accordance with Data Sheet 1-49, Perimeter Flashing.
- C. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 67 deg C (120 deg F), ambient; 100 deg C (180 deg F), material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
 - 1. Finish: 2D (dull, cold rolled).
- D. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
 - 1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color: Match Architect's samples.
 - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - b. Blind Fasteners: High-strength stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
 - 3. Fasteners for Zinc Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic,

nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- G. Solder:
 - 1. For Stainless Steel: ASTM B 32, Grade Sn60 or Grade Sn96, with acid flux of type recommended by stainless-steel sheet manufacturer.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
 - 1. Fully soldered saddles at stainless-steel flashing t-joint intersections, sill-jamb and jamb-head transitions, and other transitions in stainless steel sheet metal flashing.
- H. Do not use graphite pencils to mark metal surfaces.
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.
 - 1. Do not solder metallic-coated steel sheet.
 - 2. Do not use torches for soldering.
 - 3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 - 4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Copings: Where fabricated sheet metal copings are indicated, Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.
 - 1. Coping Profile: As indicated on the Drawings
 - 2. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, concealed backup plate.
 - 3. Fabricate from the Following Materials:
 - a. Aluminum: 0.063 inch (1.6 mm) thick.
- B. Base Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.025 inch (0.64 mm) thick.
- C. Counterflashing: Fabricate from the following materials:
 - 1. Aluminum: 0.063 inch (1.6 mm) thick.
- D. Flashing Receivers: Fabricate from the following materials:
 - 1. Stainless Steel: 0.025 inch (0.64 mm) thick.
- E. Roof-Penetration Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.025 inch (0.64 mm) thick.
- F. Equipment Support Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.025 inch (0.64 mm) thick.
- G. Roof-Drain Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.

2.7 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings with soldered joints, to extend beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams and ½ inch high upturned back leg. Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.
- B. Through-wall flashings below metal panel wall systems: Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.
- C. Through-wall flashings below glazed curtain wall systems: Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.
- D. Brick flashings at existing building: Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.

2.8 HELIPAD GUTTERS AND DOWNSPOUTS

- A. Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
 - 1. Gutter Profile: As indicated on the drawings.
 - 2. Expansion Joints: Butt type with cover plate.
 - 3. Fabricate from the following materials:
 - a. Aluminum: 0.063 inch (1.6 mm) thick.
- B. Downspouts: Fabricate rectangular open-face downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
 - 1. Hanger Style: Flat strap.
 - 2. Fabricate from the following materials:
 - a. Aluminum: 0.063 inch (1.6 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. General: Install underlayment as indicated on Drawings.
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. Torch cutting of sheet metal flashing and trim is not permitted.
 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
 1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering sheet underlayment.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood

screws metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

- E. Seal joints as shown and as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- F. Rivets: Rivet joints where indicated and where necessary for strength.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch (75-mm) centers.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
 - 1. Copings and roof edge flashings: Install in accordance with Data Sheet 1-49, Perimeter Flashing.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with sealant. Secure in a waterproof manner by means of anchor and washer at 36-inch (900-mm) centers.
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

- A. Install Opening flashings as follows unless otherwise indicated:

1. Prepare surfaces so they are smooth and free from projections that could puncture flashing.
 2. Flashing above doors, mechanical louvers, and above and below windows to be continuous pieces with no seams and include end dams at both ends. Solder joints to form a continuous flashing surrounding the opening. Install all other flashings in lengths as long as possible with as few laps as possible. Place flashing on a continuous bed of mastic. Place termination bars in a full bed of mastic. Seal termination bars, flashing top edges and lap edges, laps, fasteners, additional and corner pieces, after installation with mastic or liquid-applied air barrier (consistent with the vertical leg material). Completely press flashings and termination bar into mastic.
 3. Extend flashing the full length of lintels and shelf angles, a minimum of 4" beyond ends of lintels, and form end dams minimum 6" beyond opening. Extend flashing 1/4" out from exterior face with a 1/4" drip edge, with hemmed edge. Terminate thru-wall flashings against back-up wall with a stainless steel compression termination bar set in a full bed of flashing adhesive mastic. At heads and sills turn up ends not less than 2" to form a pan. Provide a 1" wide thin band (on concrete and masonry, 1/2" on steel) of mastic under the front edge of flashing to retard water from infiltrating under the flashing, if flashings were to be placed on these materials. At end dams, provide vertical band of mastic against stone or brick to which flashing abuts. Place these thin bands slightly back from the front edge to not drip mastic on the building face and press flashing into thin bands.
 4. Overlap end joints of copper flashings not less than 6"; coat the contacting surfaces and seal lap with mastic. Provide 16" minimum overlaps for steps in flashings. Seal exposed edges with mastic. Copper flashings shall be continuous pieces above openings. Install all other flashings in lengths as long as possible with as few laps as possible. Use full height end dams where possible.
 5. At wall opening drip pans, provide wall flanges that extend beyond window opening jambs and terminate in alignment with and turn down 2 inches into sub-sill flashing at end dams. Seal into drip pan with mastic.
 6. Separate metal flashings from other dissimilar metals with continuous application of mastic, or as recommended by flashing manufacturer.
 7. Flashings shall be protected immediately following installation.
- A. Drip Tray: Install drip tray in full and continuous contact with the top of the back-up wall to allow for transfer of window/curtain wall dead load. Integral to the drip tray provide a pre-formed drip, or form down turned leg that functions as a continuous keeper strip for sub-sill flashing installed below window opening; a preformed upturned leg that functions as a continuous back dam; pre-formed end dams at each jamb; and wall flanges that extend beyond window opening jambs and terminate in alignment with sub-sill flashing end dams. Where window openings require multiple sections of drip tray, splice joints shall be soldered air and water tight.

3.6 HELIPAD GUTTERS AND DOWNSPOUTS INSTALLATION

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated.

Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

- B. Gutters: Join sections with riveted and sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
 - 1. Fasten gutter spacers to front and back of gutter.
 - 2. Anchor and loosely lock back edge of gutter to continuous cleat.
 - 3. Anchor gutter with straps spaced not more than 24 inches (600 mm) apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.
 - 4. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet (15.24 m) apart. Install expansion-joint caps.
- C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints.
 - 1. Provide hangers with fasteners designed to hold downspouts securely to structure. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.
 - 2. Provide elbows at base of downspout to direct water away from building.
- D. Splash Pans: Install where downspouts discharge on low-slope roofs. Set in adhesive or elastomeric sealant compatible with the substrate.
- E. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches (100 mm) in direction of water flow.

3.7 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.8 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.9 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 71 00

ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copings.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
4. Section 07 62 00 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
5. Section 07 72 00 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
6. Section 07 92 00 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

D. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization. Shop Drawings: For roof specialties.
 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 4. Detail termination points and assemblies, including fixed points.
 5. Include details of special conditions.
- D. Samples for Verification:
1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
 2. Include copings made from 12-inch (300-mm) lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

- E. Delegated-Design Submittal: For copings indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of roof specialty.
- C. Product Test Reports: For copings and roof-edge flashings, for tests performed by a qualified testing agency.
- D. Sample Warranty: For manufacturer's special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class and SPRI ES-1 tested to specified design pressure.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section 07 54 23 Thermoplastic Polyolefin (TPO) Roofing.
- C. Mockups: See Section 01 45 34 "Mockups" for mockups requiring roof specialties.
- D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.
 - 1. Build mockup of typical roof edge as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.8 WARRANTY

- A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 07 54 23 "Thermoplastic Polyolefin (TPO) Roofing."
- B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design roof curbs to comply with wind performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated on the Drawings.
- C. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- D. LEED Requirements: Provide fibrous insulation products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
- E. FM Approvals' Listing: Manufacture and install copings and roof-edge specialties that are listed in FM Approvals' "RoofNav" and approved for windstorm

classification, equal to roofing classification. Identify materials with FM Approvals' markings.

1. Copings and roof edge flashings: Designed and installed in accordance with Data Sheet 1-49, Perimeter Flashing.

- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 COPINGS

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet (3.6 m), concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. OMG Roofing Products.
 - b. Pac-Clad.
 - c. Atlas International Inc.
 2. Formed Aluminum Sheet Coping Caps: Aluminum sheet, 0.063 inch (1.60 mm) thick, unless additional thickness is required to meet performance requirements.
 - a. Surface: Smooth, flat finish.
 - b. Finish: Two-coat fluoropolymer.
 - c. Color: Match Architect's sample.
 3. Corners: Factory mitered and continuously welded.
 4. Coping-Cap Attachment Method: Snap-on..
 - a. Snap-on Coping Anchor Plates: Concealed, continuous galvanized-steel sheet, .028-inch thickness.
 - b. Face-Leg Cleats: Concealed, continuous galvanized-steel sheet.

2.3 MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- C. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.

1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C) or higher.
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
- B. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Aluminum Sheet Finishes:
 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 4. Torch cutting of roof specialties is not permitted.
 - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
 - 1. Space movement joints at a maximum of **12 feet (3.6 m)** with no joints within **18 inches (450 mm)** of corners or intersections unless otherwise indicated on Drawings.
 - 2. When ambient temperature at time of installation is between **40 and 70 deg F (4 and 21 deg C)**, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below **40 deg F (4 deg C)**.

3.3 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than **6 inches (150 mm)** staggered **24 inches (600 mm)** between courses. Overlap side edges not less than **3-1/2 inches (90 mm)**. Roll laps and edges with roller. Cover underlayment within 14 days.

3.4 COPING INSTALLATION

- A. Install anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.
 - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 72 00

ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof curbs.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements. Section 05 52 13 "Pipe and Tube Railings" for safety railing systems not attached to roof-hatch curbs.
4. Section 07 61 00 "Sheet Metal Roofing" for shop- and field-formed roof curbs.
5. Section 07 62 00 "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems and miscellaneous sheet metal trim and accessories.

1.2 COORDINATION

- ###### A.
- Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

- ###### B.
- Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.3 ACTION SUBMITTALS

- ###### A.
- Product Data: For each type of roof accessory.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - C. Shop Drawings: For roof accessories.
 1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
 - D. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.
 - E. Delegated-Design Submittal: For roof curbs indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 1. Size and location of roof accessories specified in this Section.
 2. Method of attaching roof accessories to roof or building structure.

3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
4. Required clearances.

B. Sample Warranties: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.6 WARRANTY

A. Roofing-System Warranty: Roof accessories are included in warranty provisions in Section 07 54 23 "Thermoplastic Polyolefin (TPO) Roofing."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design roof curbs to comply with wind performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated on the Drawings.

C. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

D. LEED Requirements: Provide fibrous insulation products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

2.2 ROOF CURBS

A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, straight sides, and integrally formed deck-mounting flange at perimeter bottom.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Thybar Corporation.

- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Supported Load Capacity: Verify weight of units with the Mechanical Contractor.
- D. Material: Zinc-coated (galvanized) steel sheet, as required to accommodate loads, and 0.033 inch minimum thickness.
- E. Construction:
 - 1. Curb Profile: Manufacturer's standard compatible with roofing system.
 - 2. Fabricate curbs to minimum height of 12 inches (305 mm) above roofing surface unless otherwise indicated.
 - 3. Top Surface: Level top of curb, with roof slope accommodated by sloping deck-mounting flange.
 - 4. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.
 - 5. Liner: Same material as curb, of manufacturer's standard thickness and finish.
 - 6. Nailer: Factory-installed wood nailer under top flange on side of curb, continuous around curb perimeter.
 - 7. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb, of size and spacing required to meet wind uplift requirements.
 - 8. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch (19-mm) thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
 - 9. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as curb.

2.3 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Glass-Fiber Board Insulation: ASTM C 726, nominal density of 3 lb/cu. ft. (48 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C), thickness as indicated.
- C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.
- D. Reinforcing angles: Roof curb shall be internally reinforced with galvanized steel angles 48" on center.

- E. Underlayment:
 - 1. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
- F. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
- G. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.

- C. Roof Curb Installation: Install each roof curb so top surface is level.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
- B. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 81 00

APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Sprayed Fire Resistive Materials (SFRM).
 - 2. Patching of existing Sprayed Fire Resistive Materials

- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

- C. Related Sections include the following:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 1. Division 05 Sections "Structural Steel Framing" "Steel Joists", "Steel Floor Deck", And "Steel Roof Deck" for surface conditions required for structural steel receiving applied fireproofing.
 - 2. Division 07 Section "Intumescent Fireproofing."
 - 3. Division 07 Section "Penetration Firestopping" for fire-resistance-rated firestopping systems.
 - 4. Division 07 Section "Joint Firestopping" for fire-resistance-rated joint systems.

1.2 DEFINITIONS

- A. SFRM: Sprayed fire-resistive material.

- B. Cementitious: Sprayed fire-resistive material using cementitious binders and adhesive materials complying with ASTM E 1513.

- C. Concealed: Fire-resistive materials applied to surfaces that are concealed from view behind other construction when the Work is completed and have not been defined as exposed.

- D. Exposed: Fire-resistive materials applied to surfaces that are exposed to view when the Work is completed, that are in vehicle parking area, that are in bulkhead mechanical rooms, and that are identified as exposed on Drawings.

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide applied fireproofing materials and construction which are identical to those tested for the following fire performance characteristics, per test method indicated, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction.
 - 1. Basis of Design: The basis for the design of applied fireproofing shall be that beams and columns are considered un-restrained unless otherwise noted or specified.
 - 2. Fire Resistance Ratings: Indicated by design designation from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency acceptable to authorities having jurisdiction, for applied fire resistance material serving as direct applied protection tested as per ASTM E119.
 - 3. UL design listings must state that the loading was determined by Allowable Stress Design Method or Load and Resistance Factor Design Method. UL design listings requiring a load restriction factor are not allowed.
 - 4. Thickness and Density: ASTM E605, thickness and density as required by UL test to attain the fire endurance rating shown or as required by governing authorities for the application shown. Thickness shown is the minimum thickness required solely to determine clearances and, in case of conflict, the fire endurance rating prevails. For structural members of sizes not included in the UL beam and column designs, calculate the required fireproofing thickness in accordance with the equation listed in the UL "Fire Resistance Directory" for adjustment of applied protection material thickness.
 - 5. Surface Burning Characteristics: As indicated for each applied fireproofing product required, tested per ASTM E84 and listed in UL "Building Materials Directory".
 - 6. Content: Provide fireproofing products containing no detectable asbestos as determined according to the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, Polarized Light Microscopy.
- B. Source Limitations: Obtain fireproofing from single source.
- C. Engineering Judgment: For those fireproofing applications shown for which no UL tested design is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests is to be obtained and submitted to local authorities having jurisdiction for their review and approval prior to installation. Submit documentation to substantiate such review and approval.

1.4 ACTION SUBMITTALS

Product Data: Submit manufacturer's product data for each type of product specified showing compliance with performance requirements specified.

- A. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- B. Applied Fireproofing Schedule: In lieu of Shop Drawings provide a schedule for structural elements proposed to receive spray-on fireproofing noting the following:
1. Indicate each column, girder, beam, truss, joist, floor deck and roof deck member or assembly to be fireproofed, include: size of member, required fire rating on member or assembly, U.L. design test no., minimum thickness required to achieve required fire resistance rating, material and finish required by location.
 2. Indicate structural members which do not meet the minimum size requirements for a listed design, show calculations for required rating on beam, column or other structural member.
 3. Locations and types of surface preparations required before applying fireproofing material.
 4. Designation of restrained and unrestrained conditions based on definitions in ASTM E119, Appendix X3 as determined by a qualified Professional Engineer.
 5. Locations of elements to receive sealer.
- C. Shop Drawings: Structural framing plans indicating the following:
1. Locations and types of surface preparations required before applying fireproofing.

2. Extent of fireproofing for each construction and fire-resistance rating, including the following:
 - a. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 - b. Minimum thicknesses needed to achieve required fire-resistance ratings of structural components and assemblies.
 - c. Base all design designations on unrestrained members or submit designation of restrained and unrestrained conditions based on definitions in ASTM E 119, Appendix X3 as determined by a Professional Engineer licensed in Maine.
 3. Treatment of fireproofing after application.
- D. Samples for Verification: For each type of exposed fireproofing, two Samples, each 12 inches square, of each color, texture, and material formulation to be applied. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
1. Spray texture.
 2. Roller texture.
 3. Skip troweled texture.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates and Test Reports: For each type of fireproofing, signed by product manufacturer.
1. Submit test reports based on evaluation of comprehensive tests performed by a qualified testing agency, for proposed fireproofing.
 2. Submit test reports showing compliance with ASTM E1513 for cementitious content of SFRM.
 3. Submit certification signed by manufacturer of intumescent paint components certifying that products selected comply with specified requirements, has been tested and certified by UL and meets the specified requirements.
- B. Engineering Judgment: Copies of engineering judgment review and approval by local authorities having jurisdiction for fireproofing applications for which no UL tested design is available.
- C. Qualification Data: For Installer, manufacturer, professional engineer, and testing agency.
- D. Compatibility and Adhesion Test Reports: From fireproofing manufacturer indicating the following:
1. Materials have been tested for bond with substrates.
 2. Materials have been verified by fireproofing manufacturer to be compatible with substrate primers and coatings.
 3. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- E. Product Test Reports: Indicate that physical properties of proposed sprayed fire-resistive materials comply with specified requirements based on evaluation of comprehensive tests performed by a qualified testing agency, for proposed fireproofing.
1. Independent laboratory test reports of physical properties

2. U.L. Test Reports.

- F. Research/Evaluation Reports: For fireproofing, from ICC-ES.
- G. Field quality-control test and special inspection reports.
- H. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its fireproofing to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
- B. Source Limitations: Obtain each type of fireproofing through one source from a single manufacturer.
- C. Testing: By a qualified testing and inspecting agency engaged by Contractor or manufacturer to test for compliance with specified requirements for performance and test methods.
 - 1. SFRMs are randomly selected for testing from bags bearing the applicable classification marking of UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Testing is performed on specimens of SFRMs that comply with laboratory testing requirements specified in Part 2 and are otherwise identical to installed fire-resistive materials, including application of accelerant, sealers, topcoats, tamping, troweling, rolling, and water overspray, if any of these are used in final application.
 - 3. Testing is performed on specimens whose application the independent testing and inspecting agency witnessed during preparation and conditioning. Include in test reports a full description of preparation and conditioning of laboratory test specimens.
- D. Compatibility and Adhesion Testing: Engage a qualified testing and inspecting agency to test for compliance with requirements for specified performance and test methods.
 - 1. Test for bond per ASTM E 736 and requirements in UL's "Fire Resistance Directory" for coating materials. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 - 2. Verify that manufacturer, through its own laboratory testing or field experience, has not found primers or coatings to be incompatible with fireproofing.
- E. Fire-Test-Response Characteristics: Provide fireproofing with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify bags containing SFRM with appropriate markings of applicable testing and inspecting agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting

- agency acceptable to authorities having jurisdiction, for fireproofing serving as direct-applied protection tested per ASTM E 119.
2. Surface-Burning Characteristics: ASTM E 84.
 3. Identify products with appropriate markings of applicable testing and inspecting agency.
- F. Provide products containing no detectable asbestos as determined according to the method specified in 40 CFR 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."
- G. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Extent of Mockups: Approximately 9 sq. m (100 sq. ft.) of surface for each product indicated to be review by the Architect. The mock-up installation will be at the site, at a location as mutually agreed upon by the Architect and the Applicator. Include in sample application typical columns, truss, beams, girders and decking if specified to be fireproofed. Provide material finishes complying with project requirements as to density and finish where exposed to view. Notify the Architect 48 hours I advance of mock-up review. Do not proceed with work until review of mock-up sample has been completed by the Architect.
 2. After review of the mock-up, its location will be recorded and it will be retained and used as a standard of quality for the remainder of the fireproofing application.
 3. The Architect's review of the mock-up sample installation will be for final acceptance of material finish appearance, conformance with design and general quality does not relieve the applicator from the responsibility and conformance with all herein specified requirements.
 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to fireproofing including, but not limited to, the following:
1. Review products, exposure conditions, design ratings, restrained and unrestrained conditions, calculations, densities, thicknesses, bond strengths, and other performance requirements.
 2. Review and finalize construction schedule and verify sequencing and coordination requirements.
 3. Review weather predictions, ambient conditions, and proposed temporary protections for fireproofing during and after installation.
 4. Review surface conditions and preparations.
 5. Review field quality-control testing procedures.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, shelf life if applicable, and fire-resistance ratings applicable to Project.

- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, and aboveground; keep dry until ready for use. Remove from Project site and discard wet or deteriorated materials.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 4 deg C (40 deg F) or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fireproofing. Use natural means or, if they are inadequate, forced-air circulation until fire-resistive material dries thoroughly.
- C. Provide ventilation in space to receive sprayed material, introducing fresh air and exhausting air continuously during and 24 hours after application to maintain nontoxic, unpolluted, safe working area. Provide temporary enclosures to prevent spray from contaminating air. Protect adjacent surfaces and equipment from damage by overspray, fall-out and dusting-off of sprayed materials. Provide fire extinguisher and post caution signs warning against smoking and open flame when working with flammable materials.

1.9 COORDINATION

- A. Sequence and coordinate application of fireproofing with other related work specified in other Sections to comply with the following requirements:
 - 1. Provide temporary enclosure as required to confine spraying operations and protect the environment.
 - 2. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
 - 3. Do not apply fire-resistive material to metal floor deck substrates until concrete topping has been completed.
 - 4. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
 - 5. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
 - 6. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, and tested and corrections have been made to defective applications.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. FM Approvals' Listing: Applied fireproofing shall be F M Global approved. Identify materials with FM Approvals Certification markings.

- B. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
- C. Examine existing spray applied fire-proofing, and provide the same type and density of fire-proofing as the existing building, for patching of existing applied fireproofing.

2.2 CONCEALED SPRAYED FIRE-RESISTIVE MATERIALS

- A. Intermediate Durability SFRM Interior Locations, Concealed from view, for Buildings between 75 and 420 Feet Tall: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Grace Construction Products; W.R. Grace & Co. -- Conn; Monokote MK-10HB (concealed locations) or Monokote Z-106G (exposed locations).
 - b. Carbolite Company; RPM International; AD Southwest Fireproofing Type 5MD (concealed and exposed locations).
 - c. Isolatek International, Inc; Cafco 300HS , (concealed locations) Cafco 400 (exposed locations).
 - 2. Bond Strength: Minimum 430-lbf/sq. ft. (20.59-kPa) cohesive and adhesive strength based on field testing according to ASTM E 736.
 - 3. Density: Not less than 15 lb/cu. ft. (240 kg/cu. m) and as specified in the approved fire-resistance design, according to ASTM E 605.
 - 4. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than 0.375 inch (9 mm).
 - 5. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 0.
 - b. Smoke-Developed Index: 0.
 - 6. Compressive Strength: Minimum 30 lbf/sq. in. (206 kPa) according to ASTM E 761.
 - 7. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
 - 8. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
 - 9. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.
 - 10. Air Erosion: Maximum weight loss of 0.0 g/sq. ft. (0.0 g/sq. m) in 24 hours according to ASTM E 859.
 - 11. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G 21.
 - 12. Concealed Finish: Spray-textured finish.
 - a. Color in the East Tower Addition: Manufacturer's standard.
 - b. Color in the existing East Tower Building: Blue or Blue-green to identify it as material that does not contain asbestos.

2.3 EXPOSED SPRAYED FIRE-RESISTIVE MATERIALS

- A. Intermediate Durability SFRM Interior Locations, Exposed to view, in Mechanical Rooms, and Elevator Shafts, storage rooms and similar spaces, for Buildings between 75 and 420 Feet Tall: Manufacturer's standard, factory-mixed, medium density, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application.
1. Products: Subject to compliance with requirements, provide low density SFRM one of the following:
 - a. GPC Applied Technologies; Monokote® Z-106/G.
 - b. Carbolite Company; RPM International; AD Southwest Fireproofing Type Type 5MDÔ.
 - c. Isolotek International, Inc; CAFCO® 400.
- B. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property as follows:
1. Dry Density: Min. 22 pcf (350 kg/m³) for average and individual densities, or greater if required to attain fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Section 5.4.5, "Displacement Method."
 2. Thickness: Minimum average thickness required for fire-resistance design indicated according to the following criteria, but not less than 0.375 inch (9 mm), per ASTM E 605:
 - a. Where the referenced fire-resistance design lists a thickness of 1 inch (25 mm) or more, the minimum allowable individual thickness of SFRM is the design thickness minus 0.25 inch (6 mm).
 - b. Where the referenced fire-resistance design lists a thickness of less than 1 inch (25 mm) but more than 0.375 inch (9 mm), the minimum allowable individual thickness of SFRM is the greater of 0.375 inch (9 mm) or 75 percent of the design thickness.
 - c. No reduction in average thickness is permitted for those fire-resistance designs whose fire-resistance ratings were established at densities of less than 15 lb/cu. ft. (240 kg/cu. m).
 3. Bond Strength: Minimum Min. 500 psf (23.6 kN/m²) cohesive and adhesive strength based on field testing according to ASTM E 736.
 4. Compressive Strength: Minimum 50 psi (340 KPa) according to ASTM E 761.
 5. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
 6. Deflection: No cracking, spalling, or delamination per ASTM E 759.
 7. Effect of Impact on Bonding: No cracking, spalling, or delamination per ASTM E 760.
 8. Air Erosion: Maximum weight loss of 0.0 g/sq. ft. (0.0 g/sq. m) in 24 hours according to ASTM E 859.
 9. Fire-Test-Response Characteristics: Provide SFRM with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 0.
 10. Fungal Resistance: No observed growth on specimens per ASTM G 21.
 11. Concealed Finish: Spray-textured finish

2.4 AUXILIARY FIRE-RESISTIVE MATERIALS

- A. General: Provide auxiliary fire-resistive materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: For use on each substrate and with each sprayed fire-resistive product, provide primer that complies with one or more of the following requirements:
 - 1. Primer's bond strength complies with requirements specified in UL's "Fire Resistance Directory" for coating materials based on a series of bond tests per ASTM E 736.
 - 2. Primer is identical to those used in assemblies tested for fire-test-response characteristics of fireproofing per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Adhesive for Bonding Fire-Resistive Material: Product approved by manufacturer of SFRM.
- D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required to comply with fire-resistance designs indicated and fire-resistive material manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive SFRM.
- E. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by manufacturer of SFRM.
- F. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by manufacturer of intumescent mastic coating fire-resistive material. Include pins and attachment.
- G. Sealer: Tested and approved for installation by cementitious fireproofing manufacturer, tinted for visual observation. Provide one of the following or approved equal:
 - 1. "Firebond Concentrate and Firebond Adhesive" by Fiberlock Technologies, Inc.
 - 2. "Cafco Bond-Seal" by Isolatek International Corp.
 - 3. "TC 55 " by Southwest Fireproofing Products, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of work. A substrate is in satisfactory condition if it complies with the following:
 - 1. Substrates comply with requirements in the Section where the substrate and related materials and construction are specified.

2. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, incompatible paints, incompatible encapsulants, or other foreign substances capable of impairing bond of fire-resistive materials with substrates under conditions of normal use or fire exposure.
 3. Objects penetrating fire-resistive material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - a. Where these items are installed after application of spray fireproofing, return to the site and apply additional spray fireproofing to maintain fire rating of items to be fireproofed.
 4. Substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying fire-resistive material.
- B. Verify that concrete work on steel deck has been completed.
- C. Conduct tests according to fire-resistive material manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fire-resistive materials during application.
- B. Clean substrates of substances that could impair bond of fire-resistive material, including dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, and incompatible primers, paints, and encapsulants.
- C. Prime substrates where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive applied fireproofing.
- D. Clean bare metal surfaces thoroughly of foreign matter such as mortar, plaster, grease, rust, scale and dirt before priming coat is applied. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning", prior to additional surface preparation specified.
- E. Following cleaning, provide surface preparation of steel to comply with SSPC-SP 6 "Commercial Blast Cleaning," where recommended in writing by fireproofing manufacturer.
- F. Verify that substrates are free of substances capable of interfering with bond, in accordance with manufacturer's requirements for acceptance of substrates.
- G. Repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of intumescent fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION, GENERAL

- A. Comply with fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and spray on fire-resistive material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- B. Apply fireproofing that is identical to products tested as specified in Part 1 "Quality Assurance" Article and substantiated by test reports, with respect to rate of application, accelerator use, sealers, topcoats, tamping, troweling, water overspray, or other materials and procedures affecting test results.
- C. Install metal lath and reinforcing fabric, as required, to comply with fire-resistance ratings and fire-resistive material manufacturer's written recommendations for conditions of exposure and intended use. Securely attach lath and fabric to substrate in position required for support and reinforcement of fire-resistive material. Use anchorage devices of type recommended in writing by fireproofing manufacturer. Attach accessories where indicated or required for secure attachment of lath and fabric to substrate.
- D. Coat substrates with bonding adhesive before applying fire-resistive material where required to achieve fire-resistance rating or as recommended in writing by fireproofing manufacturer for material and application indicated.
- E. Extend fire-resistive material in full thickness over entire area of each substrate to be protected. Unless otherwise recommended in writing by fireproofing manufacturer, install body of fire-resistive covering in a single course.
- F. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.
- G. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply fireproofing that differs in color from that of encapsulant over which it is applied.
- H. Where sealers are used, apply products that are tinted to differentiate them from SFRM over which they are applied.
- I. Sealer: Mask off adjoining surfaces not scheduled to receive sealer and apply sealer evenly.

3.4 SFRM APPLICATION

- A. Apply SFRM in thicknesses and densities not less than those required to achieve fire-resistance ratings designated for each condition, but apply in greater thicknesses and densities if specified in Part 2 "Concealed SFRM" Article.
- B. Apply water overspray to concealed sprayed-fiber fire-resistive material as required to obtain designated fire-resistance rating.
- C. Cure SFRM according to product manufacturer's written recommendations.

- D. Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- E. Sealers: Apply to exposed SFRM, use products that are tinted to differentiate them from fireproofing over which they are applied.
- F. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- G. Repair or replace work that has not successfully protected steel.
- H. Cure fireproofing according to fireproofing manufacturer's written instructions.
- I. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- J. Finishes: Where indicated, apply fireproofing to produce the following finishes:
 - 1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
 - 2. Spray-Textured Finish: Finish left as spray applied with no further treatment.
 - 3. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.
 - 4. Skip-Troweled Finish: Even leveled surface produced by troweling spray-applied finish to smooth out the texture and neaten edges.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections and prepare reports:
 - 1. SFRM.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- C. Tests and Inspections: Testing and inspecting of completed applications of SFRM shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with application of SFRM for the next area until test results for previously completed applications of SFRM show compliance with requirements. Tested values must equal or exceed values indicated and required for approved fire-resistance design.
 - 1. Thickness for Floor, Roof, and Wall Assemblies: For each 1000-sq. ft. area, or partial area, on each floor, from the average of 4 measurements from a 144-sq. in. sample area, with sample width of not less than 6 inches per ASTM E 605.
 - 2. Thickness for Structural Frame Members: From a sample of 25 percent of structural members per floor, taking 9 measurements at a single cross section for structural frame beams or girders, 7 measurements of a single cross

- section for joists and trusses, and 12 measurements of a single cross section for columns per ASTM E 605.
3. Density for Floors, Roofs, Walls, and Structural Frame Members: At frequency and from sample size indicated for determining thickness of each type of construction and structural framing member, per ASTM E 605 or AWC Technical Manual 12-A, Section 5.4.5, "Displacement Method."
 4. Bond Strength for Floors, Roofs, Walls, and Structural Framing Members: For each 929 sq. m (10,000-sq. ft.) area, or partial area, on each floor, cohesion and adhesion from one sample of size indicated for determining thickness of each type of construction and structural framing member, per ASTM E 736.
 - a. Field test SFRM that is applied to flanges of wide-flange, structural-steel members on surfaces matching those that will exist for remainder of steel receiving fire-resistive material.
 - b. If surfaces of structural steel receiving SFRM are primed or otherwise painted for coating materials, perform series of bond tests specified in UL's "Fire Resistance Directory." Provide bond strength indicated in referenced UL fire-resistance criteria, but not less than 150 lbf/sq. ft. minimum per ASTM E 736.
 - c. Minimum thickness of sprayed fire-resistive material tested in laboratory shall be 0.75 inch.
 5. If testing finds applications of SFRM are not in compliance with requirements, testing and inspecting agency will perform additional random testing to determine extent of noncompliance.
- D. Remove and replace applications of fireproofing that do not pass tests and inspections for cohesion and adhesion, for density, or for both and retest as specified above.
- E. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate that thickness does not comply with specified requirements, and retest as specified above.
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.6 CLEANING, PROTECTING, AND REPAIR
- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
 - B. Protect fireproofing, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so fire protection will be without damage or deterioration at time of Substantial Completion.
 - C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fire protection. As installation of other construction proceeds, inspect fireproofing and patch any damaged or removed areas.
 - D. Provide patching and repairing of sprayed fireproofing damaged by other trades after application under the work for this section. Costs for such repair and patching

will be borne by the trade or Subcontractor or Contractor causing the damage. The General Contractor is to coordinate the costs of repair work between the Subcontractors or Contractors for this repair and patch work with no additional cost to the Owner for such work

END OF SECTION

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SECTION 07 81 23

INTUMESCENT FIREPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes mastic and intumescent fire-resistive coatings.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 07 81 00 "Applied Fireproofing" for sprayed fire-resistive materials (SFRM).

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review products, design ratings, restrained and unrestrained conditions, thicknesses, and other performance requirements.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Framing plans or schedules, or both, indicating the following:
1. Extent of fireproofing for each construction and fire-resistance rating.
 2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
 3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
 4. Treatment of fireproofing after application.
- D. Samples: For each exposed product and for each color and texture specified, 4 inches (102 mm) square minimum in size.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates and Test Reports: For each type of fireproofing, signed by product manufacturer.
1. Submit test reports based on evaluation of comprehensive tests performed by a qualified testing agency, for proposed fireproofing.
 2. Submit certification signed by manufacturer of intumescent paint components certifying that products selected comply with specified requirements, has been tested and certified by UL and meets the specified requirements.

- B. Engineering Judgment: Copies of engineering judgment review and approval by local authorities having jurisdiction for fireproofing applications for which no UL tested design is available
- C. Qualification Data: For Installer and testing agency.
- D. Product Test Reports: Indicate that physical properties of proposed sprayed fire-resistive materials comply with specified requirements based on evaluation of comprehensive tests performed by a qualified testing agency, for proposed fireproofing.
 - 1. Independent laboratory test reports of physical properties
 - 2. U.L. Test Reports.
- E. Product Certificates: For each type of fireproofing.
- F. Evaluation Reports: For fireproofing, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
- B. Source Limitations: Obtain each type of fireproofing through one source from a single manufacturer.
- C. Testing: By a qualified testing and inspecting agency engaged by Contractor or manufacturer to test for compliance with specified requirements for performance and test methods.
 - 1. Fire Resistive Paint Coating (Intumescent) Material Quality: Provide materials that have been tested in accordance with CAN/ULC-S101 which will result in fire resistive ratings equivalent to ASTM E119 or UL263 and are listed in the UL or ULC "Building Materials Directory" with each paint container bearing a UL or ULC Label
- D. Provide products containing no detectable asbestos as determined according to the method specified in 40 CFR 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."
- E. Fire-Test-Response Characteristics: Provide fireproofing with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify packaging with appropriate markings of applicable testing and inspecting agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" acceptable to authorities having jurisdiction, for fireproofing serving as direct-applied protection tested per ASTM E 119.
 - 2. Surface-Burning Characteristics: ASTM E 84.
 - 3. Identify products with appropriate markings of applicable testing and inspecting agency.

- F. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockup of each type of fireproofing and different substrate and each required finish as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 50 deg F (10 deg C) or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B. Source Limitations: Obtain fireproofing from single source.
- C. FM Approvals' Listing: Applied fireproofing shall be F M Global approved. Identify materials with FM Approvals Certification markings.
- D. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- E. Asbestos: Provide products containing no detectable asbestos.
- F. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide indicated products with manufacturer's product-specific Health Product Declarations (HPDs).

2.2 MASTIC AND INTUMESCENT FIRE-RESISTIVE COATINGS

- A. Interior Mastic and Intumescent Fire-Resistive Coating: Manufacturer's standard, factory-mixed, multicomponent system consisting of intumescent base coat and topcoat, and complying with indicated fire-resistance design.
1. Basis of Design Manufacturer/Product: Subject to compliance with requirements, provide Isolatek International; CAFCO SprayFilm WB 5, or comparable products by one of the following:
 - a. Albi Manufacturing; a division of StanChem, Inc.
 - b. Carboline Company; a subsidiary of RPM International.
 - c. Hilti, Inc.
 - d. International Protective Coatings.
 - e. Isolatek International.
 2. Application: Designated for "interior" use by a qualified testing agency acceptable to authorities having jurisdiction.
 3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design.
 4. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 5. Hardness: Not less than 80, Type D durometer, according to ASTM D 2240.
 6. Finish: Rolled, spray-textured finish.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.
- D. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.
- E. Interior Topcoat: See Section 09 91 23 "Interior Painting."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.
 - 1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
 - 2. Verify that objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 3. Verify that substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Conduct tests according to fireproofing manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.
- B. Clean substrates of substances that could impair bond of fireproofing.
- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, topcoats, finishing, and other materials and procedures affecting fireproofing work.
- B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

- C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
 - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
 - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- D. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.
- E. Spray apply fireproofing to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.
- F. Extend fireproofing in full thickness over entire area of each substrate to be protected.
- G. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.
- H. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- I. Cure fireproofing according to fireproofing manufacturer's written instructions.
- J. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- K. Finishes: Where indicated, apply fireproofing to produce the following finishes:
 - 1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
 - 2. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Test and inspect as required by the IBC, Subsection 17 05 .14, "Mastic and Intumescent Fire-Resistant Coatings."
- B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
- C. Fireproofing will be considered defective if it does not pass tests and inspections.

1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

D. Prepare test and inspection reports.

3.5 CLEANING, PROTECTING, AND REPAIRING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing is without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION

SECTION 07 84 13

PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
 - 2. Penetrations in horizontal assemblies.
 - 3. Penetrations in smoke barriers.

- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 07 Section "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of penetration firestopping system product indicated.

- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.

- b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For each penetration firestopping system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
- 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each penetration firestopping system configuration for construction and penetrating items.
- D. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
- 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each penetration firestopping system configuration for construction and penetrating items.
 - 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular penetration firestopping condition, submit engineers judgment drawing developed by penetration firestopping system manufacturer's fire-protection engineer in accordance with the provisions of the International Firestop Council.
- E. Samples: Submit manufacturer's standard color samples for selection by Architect for exposed to view penetration firestopping systems.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- B. Product Test Reports: From a qualified testing agency indicating penetration firestopping system complies with requirements, based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.
 - 1. Classified System drawings from the F M Approvals Guide.
 - 2. UL in its "Fire Resistance Directory."

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
- B. Installer Training: Individuals performing the installation of penetration firestopping systems shall be trained by a direct representative of the joint firestopping systems materials manufacturer, not a distributor or agent.
- C. Installation Responsibility: Assign installation of penetration firestopping systems and joint firestopping systems in Project to a single qualified installer.
- D. Source Limitations: Obtain penetration firestopping systems from a single manufacturer.
- E. Provide penetration firestopping systems products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."
- F. Fire-Test-Response Characteristics: Provide penetration firestopping systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspection agency, performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Penetration firestopping systems are identical to those tested per ASTM E 814, under conditions where positive furnace pressure differential of at least 0.01 inch of water is maintained at a distance of 0.78 inch below the fill materials surrounding the penetrating items in the test assembly.. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping system products bear classification marking of qualified testing and inspecting agency.
 - b. Penetration firestopping systems correspond to those indicated by reference to penetration firestopping system designations listed by the following:
 - 1) FM Global in its "Building Materials Approval Guide."

- G. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver penetration firestopping system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
- B. Store and handle materials for penetration firestopping systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate with installation of fire rated pathways by other Specification Sections.
 - 1. See Section XX XX XX "Raceways and Boxes for Electrical Systems"
- B. Coordinate size and location of cast-in-place firestop devices to accommodate planned pipe and cable runs. Ensure proper placement of devices before placement of concrete.
- C. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- D. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- E. Notify Owner's testing and inspection agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.
- F. Do not cover up penetration firestopping system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide penetration firestopping systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 3. Fire-resistance-rated floor assemblies.
 4. Fire-resistance-rated roof assemblies.
- B. Rated Systems: Provide penetration firestopping systems with the following ratings determined per ASTM E 814 or UL 1479:
1. F-Rated Systems: Provide penetration firestopping systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
 2. T-Rated Systems: For the following conditions, provide penetration firestopping systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
 - c. Penetrations into storage areas containing combustible materials.
 3. L-Rated Systems: Where penetration firestopping systems are indicated in smoke barriers, provide penetration firestopping systems with L-ratings of not more than 0.01524 cu. m/s x sq. m (3.0 cfm/sq. ft) at both ambient temperatures and 204 deg C (400 deg F).
 4. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- C. For penetration firestopping systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant penetration firestopping systems.
 2. For floor penetrations with annular spaces exceeding 100 mm (4 inches) in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide penetration firestopping systems not requiring removal of insulation.
- D. For penetration firestopping systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.
- E. Systems and Product Selection:

1. When not shown on the Drawings, it is the Installing Contractor's undivided responsibility to select proposed systems and products which are appropriate for the types of penetrations, construction systems and the required fire resistance ratings shown on the Drawings and which comply with the requirements of this specification, subject to review by the Architect.
2. Proprietary products and UL designs when indicated on the Drawings are not intended to imply that products and UL designs of the manufacturer are required to the exclusion of equivalent products of other named acceptable manufacturers.

F. LEED Performance Requirements

1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.2 MANUFACTURERS

- A. Basis of Design Manufacturer: Subject to compliance with requirements, provide products by Specified Technologies Co., or provide comparable products by one of the following:
1. HiltiConstruction Chemicals, Inc, Tulsa, OK 74146.
 2. Flamesafe - W.R. Grace & Co., Hatfield, PA 19440
 3. The RectorSeal Corporation, Houston, TX 77023.
 4. Specified Technologies Co., Sommerville, NJ 08876.
 5. 3M Fire Protection Products.
 6. Tremco, Inc.; Tremco Fire Protection Systems Group.

2.3 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls.
 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. Horizontal assemblies include floors floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.
 2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.

3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 4. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- F. Provide sealants and putties that are integrally colored by manufacturer so they are readily identifiable as firestopping products. White or light colored products, or field-colored products will not be acceptable.
- G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required and comply with "Performance Requirements" Article. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
 - a. Semirefractory -fiber or slag/rock-mineral wool-insulation.
 - b. Ceramic fiber.
 - c. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - d. Fire-rated form board.
 - e. Joint Fillers for joint sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.4 FILL MATERIALS

- A. General: Provide penetration firestopping systems containing the types of fill materials indicated in the Penetration firestopping System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic or plastic casing lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating on all six sides contained in a flame retardant poly bag.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Moisture Curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and other sloped surfaces or plastic casing surfaces requiring a non-slumping, gunnable sealant, unless indicated firestopping limits use to nonsag grade for both opening conditions.
- L. Intumescent Acrylic Sealant: Firestop sealant that expands when exposed to heat. Protects penetrations containing combustible and non-combustible penetrants.
- M. Foam "sponge-line" Blocks: Re-penetratable intumescent blocks that may be friction fit, deformed, or cut to fit in through penetration openings.
- N. Fire Rated Cable Pathways: Gangable device modules capable of being retrofitted around existing cables and comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill and requiring no additional action in the form of plugs, twisting closure, putty, pillow, or sealant to achieve fire and leakage ratings.
- O. Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing cable penetrations up to 0.53 in. (14 mm) diameter.
- P. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts.

- Q. Firestop Plugs: Re-enterable, foam rubber plug impregnated with intumescent material capable of expanding minimum 10 times with expansion beginning at 350°F (177°C) for use in blank openings and cable sleeves,
- R. Fire-Rated Closet Flange Gasket: Molded, single-component, intumescent gasket for use beneath a closet flange in floor applications.
- S. Polyurethane Firestop Foam: Two component polyurethane foam created through chemical reaction of polyol, water and polyisocyanate, plus flame retardants and other additives (all included in the polyol component). Foam cures within one minute at room temperature to produce non-shrinking smoketight firestopping system and does not require additional firestop coating.
 - 1. Acceptable Product: CP620 Fire Foam by Hilti.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.5 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Follow manufacturer's application and installation instructions. In situations where the requirements of this Section differ from those of the manufacturer, the more conservative requirements shall govern.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove all foreign materials from surfaces of opening joint substrates and from penetrating items that could interfere with adhesion of penetration firestopping.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings of designated penetration firestopping systems.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: See Section 09 91 23 "Interior Painting."
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."

2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified independent inspecting agency to inspect penetration firestopping systems and to prepare test reports.
 1. Inspecting agency will state in each report whether inspected penetration firestopping systems comply with or deviate from requirements.
 2. Do not enclose through--penetration firestop systems comply with or deviate from requirements.
 3. Inspection agency shall verify that installed systems are in accordance with either a FM Global-approved system or engineer judgement drawing as described in Part 1.
- B. Inspections: Provide on-site inspections for fire stops in accordance with ASTM E2174, and on-site inspections for fire resistive joint systems and perimeter fire barriers in accordance with ASTM E2393 as the work progresses. Verify that firestopping systems have been constructed in compliance with the submitted designs for fire rating required by the Contract Documents and are acceptable to Authorities having jurisdiction.
 1. Visual inspection of substrates before installation of firestopping to ascertain that preparation has been performed in accordance with the Contract Documents.
 2. Visual inspection of completed work including removal of damming materials if used to ensure an adequate and complete fire and smoke seal.
 3. Final inspection after other trades have completed Work in contact with firestopping material, but before firestopping material is covered.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued.
- D. Where deficiencies are found, repair or replace penetration firestopping systems so they comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

- A. Firestop Systems with No Penetrating Items: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 614, C-AJ-0014, C-AJ-0015, C-AJ-0094, C-AJ-0113, W-L-0034, by STI.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Mineral Wool Batt
 - b. Silicone sealant.
- B. Firestop Systems for Metallic Pipes, Conduit, or Tubing: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 129, C-AJ-1240, C-AJ-1353, W-L-1049, W-L-1222, by STI.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Acrylic sealant.
 - d. Intumescent putty.
 - e. Mortar.
 - f. Polyurethane firestop foam.
- C. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Designs 475, 629, C-AJ-2282, C-AJ-2292, C-AJ-2297, C-AJ-2298, W-L-2048, W-L-2237, W-L-2243, by STI.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Intumescent wrap strips.
 - c. Steel collar.
- D. Firestop Systems for Electrical Cables: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 129, W-L-3210, W-L-3306, W-L-3377, C-AJ-3154, W-J-3158, F-A-3054 by STI.
 - b. Type of Fill Materials: One or more of the following:
 - c. Intumescent sealant.
 - d. Latex Sealant
 - e. Pillows/bags
 - f. Intumescent putty.
 - g. Silicone foam.

- E. Firestop Systems for Telephone and Data Cables: Comply with the following:
 - 1. Wall Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 499, 502, 601, 602, W-L-3210, W-L-3306, W-L-3377, C-AJ-3154, W-J-3158, F-A-3054 by STI.
 - 2. Firestop device: EA Path (various series).

- F. Firestop Systems for Cable Trays with Electric Cables: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 129, 603, W-L-4008, W-L-4043, W-L-4079, C-AJ-4029, C-AJ-4030, C-AJ-4089, by STI.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Intumescent putty.
 - c. Intumescent sheet.
 - d. Steel cover plate.
 - e. Silicone foam.
 - f. Pillows/bags.
 - g. Foam blocks.
 - h. Firestop mortar.
 - i. Polyurethane firestop foam.

- G. Firestop Systems for Insulated Pipes: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 133, 468, W-L-5054, W-L-5121, C-AJ-5087, C-AJ-5138 by STI.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Silicone foam.
 - c. Intumescent wrap strips.
 - d. Pre-formed intumescent blocks.
 - e. Latex sealant.

- H. Firestop Systems for Miscellaneous Electrical Penetrants: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 129, by STI.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Latex sealant
 - c. Intumescent putty.
 - d. Mortar.

- I. Firestop Systems for Miscellaneous Mechanical Penetrations: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 129, W-L-7025, W-L-7029, W-L-7149, W-L-7060, W-L-7202, C-AJ-7027, C-AJ-7143, W-J-7007 by STI.
 - 2. Type of Fill Materials: One or both of the following:
 - a. Intumescent sealant.
 - b. Latex sealant.
 - c. Mortar.
 - d. Acrylic sealant.
 - e. Silicone sealant.

- J. Firestop Systems for Groupings of Penetrations: Comply with the following:
 - 1. Wall & Floor Penetration Fire Stops (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. Fire Stop Design 129, W-L-8026, W-L-8050, W-L-8073, C-AJ-8093, C-AJ-8113, C-AJ-8181 by STI.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Mortar.
 - c. Intumescent wrap strips.
 - d. Firestop device.
 - e. Intumescent composite sheet.
 - f. Pre-formed intumescent blocks.
 - g. Polyurethane firestop foam.

END OF SECTION

SECTION 07 84 43

JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.
2. Joints at exterior curtain-wall/floor intersections.
3. Joints in smoke barriers.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 07 84 13 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.
4. Section 07 95 00 "Expansion Control" for fire-resistive architectural joint systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For each joint firestopping system, show each kind of construction condition in which joints are installed and relationships to adjoining construction. Include joint firestopping system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each joint firestopping system configuration for construction and penetrating items.
 2. Where project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular joint system firestop condition, submit engineer judgement drawing developed by joint firestop system manufacturer's fire-protection engineer in accordance with the provisions of the International Firestop Council.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- B. Product Test Reports: From a qualified testing agency indicating joint system firestop complies with requirements, based on evaluation of comprehensive tests performed by a qualified testing agency, for joint firestopping.
 - 1. Classified System drawings from the F M Approvals Guide.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."
- B. Installer Training: Individuals performing the installation of joint firestopping systems shall be trained by a direct representative of the joint firestopping systems materials manufacturer, not a distributor or agent.
- C. Installation Responsibility: Assign installation of joint firestopping systems and penetration firestopping systems in Project to a single qualified installer.
- D. Source Limitations: Obtain joint firestopping systems from a single manufacturer.
- E. Provide joint firestopping systems products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."
- F. Fire-Test-Response Characteristics: Provide joint firestopping systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspection agency, performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Joint Firestopping systems are identical to those tested per ASTM E 1966 (UL 2079), under conditions where positive furnace pressure differential of at least 0.01 inch of water is maintained at a distance of 0.78 inch below the fill materials surrounding the penetrating items in the test assembly.. Provide rated systems complying with the following requirements:
 - a. Joint firestopping system products bear classification marking of qualified testing and inspecting agency.
 - b. Joint firestopping systems correspond to those indicated by reference to joint firestopping system designations listed by the following:
 - 1) FM Global in its "Building Materials Approval Guide."
- G. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver joint firestopping system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multi-component materials.

- B. Store and handle materials for joint firestopping systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.
- C. Notify Owner's testing agency at least seven days in advance of joint firestopping system installations; confirm dates and times on day preceding each series of installations.
- D. Do not cover up joint firestopping system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Provide joint firestopping systems that are produced, tested and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which joint firestopping systems are installed.
- B. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) FM Approvals' Listing
 - 2) UL in its "Fire Resistance Directory."
- C. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of

construction that they join, and with movement capabilities, W and L-ratings indicated as determined by ASTM E1966 (UL 2079) under a positive pressure differential not less than 0.01 in. water column and classified with ratings for fire resistance, leakage, and movement capability to meet the specified requirements.

- D. Perimeter Fire-Containment (Barrier) Systems: For joints between edges of fire-resistance-rated floor assemblies and exterior wall assemblies, provide systems of type as determined by NFPA 285 and ASTM E2307 under positive pressure differential of not less than 0.01 in. water column and classified with ratings for integrity, insulation, leakage, and movement capability to meet the specified requirements.
 - 1. FM Global-approved, Fire Resistance of Perimeter Fire-Containment Systems: Integrity and insulation ratings equal or exceeding fire resistance ratings of floor or floor wall and floor ceiling assembly forming one side of joint, as indicated as determined by applicable codes and ASTM E2307.
- E. FM Approvals' Listing: Identify materials with FM Approvals Certification markings.
- F. For fire resistive joint systems assemblies exposed to view:
 - 1. Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
 - 2. At traffic, moisture and subject physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
- G. Building Movement: Provide fire resistive joint systems suitable to withstand building movements, including thermal movements, loading deflections, shrinkage, creep and similar movements, when tested in accordance with specified standards.
- H. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.2 MANUFACTURERS

- A. Basis-of-Design Products: Subject to compliance with requirements, provide products by Specified Technologies Inc or comparable products by one of the following:
 - 1. Hilti, Inc.
 - 2. RectorSeal Corporation.
 - 3. Specified Technologies Inc.
 - 4. 3M Fire Protection Products.
 - 5. Tremco, Inc.; Tremco Fire Protection Systems Group.

2.3 JOINT FIRESTOPPING SYSTEMS

- A. Where required, provide joint firestopping systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or

between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 (UL 2079):
 - 1. Joints include those installed in or between fire-resistance-rated walls floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
 - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
- C. Joints at Exterior Curtain-Wall/Floor Intersections: Provide joint firestopping systems with rating determined by ASTM E 2307 based on testing at a positive pressure differential of 2.49 Pa (0.01-inch wg).
 - 1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.
- D. Joints in Smoke Barriers: Provide joint firestopping systems with ratings determined per UL 2079.
 - 1. L-Rating: Not exceeding 0.00775 cu. m/s x m (5.0 cfm/ft) of joint at 74.7 Pa (0.30 inch wg) at both ambient and elevated temperatures.
- E. Exposed Joint firestopping Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- F. Accessories: Provide components of joint firestopping systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing joint firestopping systems to comply with joint firestopping system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent fill materials of joint firestopping system from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing joint firestopping system's seal with substrates.

3.3 INSTALLATION

A. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of joint firestopping system.

C. Install fill materials for joint firestopping systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.

2. Apply fill materials so they contact and adhere to substrates formed by joints.

3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: See Section 09 91 23 "Interior Painting."

B. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."

2. Contractor's name, address, and phone number.

3. Designation of applicable testing agency.

4. Date of installation.

5. Manufacturer's name.

6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Floor-to-Floor, Joint firestopping System:
 - 1. Floor-to-Floor Joint firestopping (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. FW-D-1007, FW-D-1008, by STI.
 - 2. Assembly Rating: Refer to Drawings.
 - 3. W-Rating: No leakage of water at completion of water leakage testing.
 - 4. Nominal Joint Width: As indicated.
 - 5. Movement Capabilities: Class II; refer to Drawings.
- B. Wall-to-Wall, Joint firestopping System equivalent to, but not limited to, the following:
 - 1. Wall-to-Wall Joint firestopping (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. WW-D-0103, WW-D-1089, WW-D-1090, WW-D-1091, by STI.
 - 2. Assembly Rating: Refer to Drawings.
 - 3. Nominal Joint Width: As indicated.
 - 4. Movement Capabilities: Class II; refer to Drawings.
- C. Floor-to-Wall, Joint firestopping System equivalent to, but not limited to, the following:
 - 1. Floor-to-Wall Joint firestopping (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. FW-D-1006, FW-D-1007, FW-D-1010, by STI.
 - 2. Assembly Rating: Refer to Drawings.
 - 3. W-Rating: No leakage of water at completion of water leakage testing.

4. Nominal Joint Width: As indicated.
 5. Movement Capabilities: Class II; refer to Drawings.
- D. Head-of-Wall, Joint firestopping System equivalent to, but not limited to, the following:
1. Head-of-Wall Joint firestopping (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. HW-D-0043, HW-D-0079, HW-D-0086, HW-D-0099, HW-D-0252, HW-D-0548, by STI.
 2. Assembly Rating: Refer to Drawings.
 3. Nominal Joint Width: As indicated.
 4. Movement Capabilities: Class II; refer to Drawings.
- E. Bottom-of-Wall, Joint firestopping Systems equivalent to, but not limited to, the following:
1. Bottom-of-Wall Joint firestopping (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. BW-S-0003, BW-S-0020, by STI.
 2. Assembly Rating: Refer to Drawings.
 3. Nominal Joint Width: As indicated.
 4. Movement Capabilities: Class II; refer to Drawings.
- F. Perimeter Fire-Barrier Joint firestopping Systems equivalent to, but not limited to, the following:
1. Perimeter Fire-Barrier Joint firestopping (FM Approval Class Number 4990) Series Systems equivalent to, but not limited to, the following:
 - a. CW-D-1002, CW-D-1004, CW-S-0006, CW-S-0001, CW-S-1012, by STI.
 2. Assembly Rating: Refer to Drawings.
 3. W-Rating: No leakage of water at completion of water leakage testing.
 4. Nominal Joint Width: As indicated.
 5. Movement Capabilities: Class II; refer to Drawings.

END OF SECTION

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SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Section 07 84 46 "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
5. Section 08 80 00 "Glazing" for glazing sealants.
6. Section 09 30 00 "Tiling" for sealing tile joints.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 or manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Submit not fewer than eight pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.

3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
 5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 2. Conduct field tests for each application indicated below:
 - a. Each kind of sealant and joint substrate indicated.
 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:

- c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- D. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 13-mm- (1/2-inch-) wide joints formed between two 150-mm- (6-inch-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- E. Joint-Sealant Schedule: Include the following information:
- 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For qualified Installer and testing agency.
 - B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
 - C. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
 - D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

- E. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- F. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- G. Field-Adhesion Test Reports: For each sealant application tested.
- H. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
 - 2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.
- D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
 - 1. See Section 01 43 39 "Room Mockup requirements" for room mockups requiring sealants.
 - 2. See Section 01 45 34 "Mockups for Exterior Wall Systems" for mockups requiring sealants.
- E. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 5 deg C (40 deg F).
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 5 years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products indicated for each type in the sealant schedules at the end of Part 3.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant (Designation S-GB): Provide one of the following as required for joints indicated:
 1. ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Dow Corning Corporation; 790.
 - 2) GE Advanced Materials - Silicones; SilPruf LM SCS2700.
 - 3) Pecora Corporation; 890 or 890FTS.
 - 4) Sika Corporation, Construction Products Division; SikaSil-C990.
 - 5) Tremco Incorporated; Spectrem 1.
 2. ASTM C 920, Type S, Grade NS, Class 50, for Use NT.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) BASF Building Systems; Omniseal 50.
 - 2) Dow Corning Corporation; 756 SMS or 795.
 - 3) GE Advanced Materials - Silicones; SilPruf NB SCS9000, SilPruf SCS2000 or UltraPruf II SCS2900.
 - 4) Pecora Corporation; 864 or 895.
 - 5) Sika Corporation, Construction Products Division; SikaSil-C995.
 - 6) Tremco Incorporated; Spectrem 2 or Spectrem 3.

2.4 URETHANE JOINT SEALANTS

- A. Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant / Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant (Designation U-TB): Provide one of the following as required for joints indicated.
 1. ASTM C 920, Type S, Grade NS, Class 25, for Use T.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) BASF Building Systems; Sonolastic NP1, Sonolastic Ultra.
 - 2) Sika Corporation, Construction Products Division; Sikaflex - 1a.
 - 3) Tremco Incorporated; Vulkem 116.
 2. ASTM C 920, Type S, Grade P, Class 25, for Use T.

- a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) BASF Building Systems; Sonolastic SL 1.
 - 2) Bostik, Inc.; Chem-Calk 950.
 - 3) Pecora Corporation; Urexpan NR-201.
 - 4) Schnee-Morehead, Inc.; Permathane SM7101.
 - 5) Sika Corporation. Construction Products Division; Sikaflex - 1CSL.
 - 6) Tremco Incorporated; Vulkem 45 or Vulkem 45 SSL.
3. ASTM C 920, Type M, Grade NS, Class 25, for Use T.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) BASF Building Systems; Sonolastic NP 2.
 - 2) Pecora Corporation; Dynatred.
 - 3) Sika Corporation, Construction Products Division; Sikaflex - 2c NS, Sikaflex - 2c EZ Mix.
 - 4) Tremco Incorporated; Vulkem 227 or Dymeric 240FC.

2.5 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) for all sealants, except silicone and horizontal joints. Type O (open-cell material) for silicone sealants. Provide size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Backings shall be approximately 25% larger than joint.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - d. Exterior insulation and finish systems.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
 - 1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 - 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 10 mm (3/8 inch). Hold edge of sealant bead 6 mm (1/4 inch) inside masking tape.
 - 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 - 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

- H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.
- I. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. See Section 01 45 36 "Performance Testing for Exterior."
- C. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Items Not to be Sealed:
 - 1. Joints covered by joint covers and seals specified in Division 07 Section "Expansion Joint Cover Assemblies."
 - 2. Penetrations in fire-rated assemblies. Use firestop sealants as specified in Division 07 Section "Penetration Firestopping."
 - 3. Joints in and perimeter of fire-rated assemblies. Use firestop sealants as specified in Division 07 Section "Fire-Resistant Joint Sealants."
 - 4. Joints, perimeter, and penetrations in sound-rated assemblies. Use acoustical sealant. Installation is specified with sound-rated assembly in Division 09 Section "Gypsum Board."
 - 5. Weep holes in masonry, storefront, and windows.

- B. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.
 2. Urethane Joint Sealant: Single component, pourable, traffic grade or multicomponent, nonsag, traffic grade, Class 25. (Designation U-TB)
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between plant-precast architectural concrete units.
 - c. Joints in Portland cement plaster system, including preformed control and expansion joints.
 - d. Joints between metal panels.
 - e. Joints between different materials listed above.
 - f. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - g. Other joints as indicated.
 2. Silicone Joint Sealant: Single component, nonsag, neutral curing Class 100/50 or Single component, nonsag, neutral curing, Class 50. (Designation S-GP)
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control joints in cast-in-place concrete slabs.
 - c. Other joints as indicated.
 2. Urethane Joint Sealant: Single component, nonsag / pourable, traffic grade or multicomponent, nonsag, traffic grade, Class 25. (Designation U-TB)
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of interior and exterior walls.
 - b. Perimeter joints of exterior and interior openings.
 - c. Other joints as indicated.
 2. Silicone Joint Sealant: Single component, nonsag, Class 50. (Designation U-SC)
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

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SECTION 07 95 00

EXPANSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Architectural joint systems for building interiors.
 - 2. Architectural joint systems for building exteriors.
 - 3. Architectural joint systems for roofs.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections include the following:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 03 Section "Cast-in-Place Concrete" for cast-in architectural-joint-system frames furnished, but not installed, in this Section.
 - 4. Division 07 Section "Fire-Resistive Joint Systems" for liquid-applied joint sealants in fire-resistive building joints.
 - 5. Division 07 Section "Joint Sealants" for liquid-applied joint sealants.

1.2 DEFINITIONS

- A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage (plus or minus) of nominal value of joint width.

- D. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide factory-fabricated architectural joint systems capable of withstanding the types of loads and of accommodating the kinds of movement, and the other functions for which they are designed including those specified below, without failure. Types of failure include those listed in Appendix X3 of ASTM E 1399.
 - 1. Pedestrian Traffic Joints: Support pedestrian traffic across joint.
 - 2. Exterior Joints: Maintain continuity of weather enclosure.
 - 3. Joints in Fire-Resistance-Rated Assemblies: Maintain fire-resistance ratings of assemblies.
 - 4. Joints in Smoke Barriers: Maintain integrity of smoke barrier.
 - 5. Joints in Acoustically Rated Assemblies: Inhibit passage of airborne noise.
 - 6. Other Joints: Where indicated, provide joint systems that prevent penetration of water, moisture, and other substances deleterious to building components or content.
 - 7. Joints in Surfaces with Architectural Finishes: Serve as finished architectural joint closures.

1.4 ACTION SUBMITTALS

- A. Product Data: Include manufacturer's product specifications, construction details, material and finish descriptions, and dimensions of individual components and seals.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.

- e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Provide the following for each joint system specified:
- 1. Placement Drawings: Include line diagrams showing plans, elevations, sections, details, splices, blockout requirement, entire route of each joint system, and attachments to other work. Where joint systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
 - 2. Architectural Joint System Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
 - a. Manufacturer and model number for each joint system.
 - b. Joint system location cross-referenced to Drawings.
 - c. Nominal joint width.
 - d. Movement capability.
 - e. Classification as thermal or seismic.
 - f. Materials, colors, and finishes.
 - g. Product options.
 - h. Fire-resistance ratings.
- D. Samples for Initial Selection: For each type of expansion control assembly indicated with factory-applied color finishes.
- E. Samples for Verification: For each type of architectural joint system indicated.
- 1. Full width by 12 inches long, for each system required.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Samples for Initial Selection: For each type of joint system indicated.
 - 1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.
 - B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for current products.
 - C. Research/Evaluation Reports: Evidence of architectural joint system's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- 1.6 QUALITY ASSURANCE
- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Refer to Division 01 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Accessibility Requirements: Comply with applicable provisions in [the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)"] [and] [ICC A117.1].
- D. Fire-Test-Response Characteristics: Where indicated, provide architectural joint system and fire-barrier assemblies identical to those of assemblies tested for fire resistance per UL 2079 or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies shall be subjected to hose stream testing.

1.7 COORDINATION

- A. Coordinate installation of exterior wall and soffit joint systems with roof expansion assemblies to ensure that wall transitions are watertight. Roof expansion assemblies are specified in Division 07.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store expansion joint assemblies and associated materials in such a manner as to prevent damage or deterioration in accordance with the manufacturer's recommendations. Packaged materials shall be in original containers and wrappings with seals unbroken and labels intact until time of installation. Store all materials above ground in a dry place under weatherproof covers. All damaged or otherwise unsuitable materials, when so ascertained, shall be immediately removed from the job site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.
 - 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
 - 2. Mill Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
 - 3. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
- B. Elastomeric Seals: Preformed elastomeric membranes or extrusions to be installed in metal frames.

- C. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.
- D. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required rating period.
- E. Secondary Seal: Flexible elastomeric material, EPDM, minimum 45 mils thick.
 - 1. Drain-Tube Assemblies: Where indicated, equip secondary seal with drain tubes and seals to direct collected moisture as indicated on Drawings.
- F. Thermal Insulation: At roof, fill space above secondary seal with mineral-fiber blanket or manufacturer's standard, factory-installed mineral-fiber insulation; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84.
- G. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.2 ARCHITECTURAL JOINT SYSTEMS, GENERAL

- A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
 - 1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where joint changes direction or abuts other materials.
 - 2. Include factory-fabricated closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.
- B. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
- C. Design architectural joint systems for the following size and movement characteristics:
 - 1. Nominal Joint Width: As indicated on Drawings.
 - 2. Movement Capability: Plus or minus 50 percent.
 - 3. Type of Movement: Thermal, Wind Sway, Seismic.

2.3 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING INTERIORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- B. Basis-of-Design Product: Subject to compliance with requirements, provide the products specified in individual subparagraphs below as basis-of-design products or a comparable product by one of the following:
1. CS Construction Specialties.
 2. Balco.
 3. MM Systems.
- C. Architectural Joint Systems for Interior Walls and Ceilings [**IEJS-1**]:
1. Basis-of-Design Product: C S Specialties; LAF Series.
 2. Type: Flush covers designed for large seismic joints.
 - a. Cover Material: Aluminum.
 - 1) Clear anodize on any exposed aluminum.
 3. Frame: Aluminum, Concealed by joint compound.
 4. Self-Centering Bar and Pantograph Control Mechanism: Shock cord.
 5. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
 6. Nominal Joint Width: As indicated on the drawings.
- D. Architectural Joint Systems for Interior Walls and Ceilings [**IEJS-2**]:
1. Basis-of-Design Product: C S Specialties; SGC Series.
 2. Type: Flush covers designed for large seismic joints.
 - a. Cover Material: Aluminum.
 - 1) Clear anodize on any exposed aluminum.
 - 2) Cover plate can be painted to match adjacent ceiling finishes.
 3. Frame: Aluminum, Concealed by joint compound.
 4. Self-Centering Bar and Pantograph Control Mechanism: C1075 Blue Temper Spring Steel.
 5. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
 6. Nominal Joint Width: As indicated on the drawings.
- E. Architectural Joint Systems for Interior Walls and ceilings [**IEJS-3**]:
1. Basis-of-Design Product: C S Specialties; SGW Series.
 2. Type: Flush wall covers designed for large seismic joints.
 - a. Cover Material: Aluminum.
 - 1) Color: As selected by Architect from manufacturer's full range.
 3. Frame: Aluminum, Concealed by joint compound.
 4. Self-Centering Bar and Pantograph Control Mechanism: C1075 Blue Temper Spring Steel.
 5. Dual gaskets
 - a. Color: As selected by the Architect from Manufacturer's standard colors.
 6. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
 7. Nominal Joint Width: As indicated on the drawings.
- F. Architectural Joint Systems for Interior Floors [**IEJS-4**]:
1. Basis-of-Design Product: C S Specialties; RFD Series.
 2. Type: Hinged extruded aluminum cover plate.
 - a. Color: Mill finish.
 3. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
 4. Nominal Joint Width: As indicated on the drawings.

2.4 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING EXTERIORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the products specified in individual subparagraphs below as basis-of-design products or a comparable product by one of the following:
1. BASF (Wabo).
- B. Architectural Joint Systems for Exterior Walls [**EEJS-1**]:
1. Basis-of-Design Product: Wabo®WeatherSeam Exterior.
 2. Type: Elastomeric seals completely cover the supporting aluminum frame.
 - a. Seal Material: Manufacturer's standard.
 - b. Weather facing: Vinyl bellows.
 - 1) Color: As selected by Architect from manufacturer's full range.
 3. Self-Centering Bar and Pantograph Control Mechanism: Nylon
 4. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
 5. Nominal Joint Width: As indicated on the drawings.
- C. Architectural Joint Systems for Exterior Walls, Interior, and where indicated [**EEJS-2**]:
1. Basis-of-Design Product: EMSEAL Joint Systems, Ltd. Seismic Colorseal.
 2. Type: Preformed cellular foam.
 - a. Foam Material: Manufacturer's standard.
 - b. Weather facing: Factory applied silicone bellows.
 - 1) Color: As selected by Architect from manufacturer's full range of 25 colors minimum, or match Architect's sample.
 3. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
 4. Nominal Joint Width: As indicated on the drawings.
 5. Movement Capability: +50%, -50%.
 6. Transitions: Factory fabricated transitions from vertical to horizontal.

2.5 ARCHITECTURAL JOINT SYSTEMS FOR ROOFS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the products specified in individual subparagraphs below as basis-of-design products or a comparable product by one of the following:
1. Construction Specialties.
- B. Architectural Joint Systems for Roofs [**REJS-1**]:
1. Basis-of-Design Product: CS Marc Series.
 2. Type: structural frame assembly with a standing seam roof cover plate.
 - a. Frame: Extruded Aluminum.
 - b. Seal Material: EPDM.
 - c. Cover: Aluminum standing seam.
 - 1) Finish: 2-coat Kynar, AAMA 2605.
 - 2) Color: As selected by Architect from manufacturer's full range.
 3. Self-Centering Bar and Pantograph Control Mechanism: Nylon.
 4. Lateral Slide / Slider Assembly: Aluminum, Acetal rod, Acetal plates (low friction, high density polymer).
 5. Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.

6. Nominal Joint Width: As indicated on the drawings.
7. Movement Capability: +100%, -100%.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and blockouts where architectural joint systems will be installed for installation tolerances and other conditions affecting performance of work.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to architectural joint system manufacturer's written instructions.
- B. Repair concrete slabs and blockouts using manufacturer's recommended repair grout of compressive strength adequate for anticipated structural loadings.
- C. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing architectural joint assemblies and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install joint systems.
 1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper joint installation and performance.
 3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 4. Locate in continuous contact with adjacent surfaces.

5. Standard-Duty Systems: Shim to level where required. Support underside of frames continuously to prevent vertical deflection when in service.
 6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Foam Seals: Install with adhesive recommended by manufacturer.
- D. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.
- E. Fire-Resistance-Rated Assemblies: Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.
1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.
- 3.4 PROTECTION
- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION

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SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Standard hollow metal doors.
 - 2. Standard hollow metal door frames.
 - 3. Standard hollow metal sidelight frames
 - 4. Standard hollow metal borrowed-light frames.
 - 5. Standard hollow metal fire-rated door and frame assemblies.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.
 - 4. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to SDI A250.8.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Submittals shall be started immediately following Contract Notice to Proceed to achieve early frame delivery.
- B. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- C. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Ceilings, Walls, Thermal and Acoustical Insulation products.
- D. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Locations of reinforcement and preparations for hardware.
 5. Details of each different wall opening condition.
 6. Details of anchorages, joints, field splices, and connections.
 7. Details of accessories.
 8. Details of moldings, removable stops, and glazing.
 9. Details of conduit and preparations for power, signal, and control systems.
- E. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.
- 1.6 INFORMATIONAL SUBMITTALS
- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
1. Provide additional protection to prevent damage to factory-finished units.
- B. Frames: Arrange for early separate delivery of hollow metal door frames to be installed in masonry, in concurrence with masonry work.
- C. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- D. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ceco Door Products; an Assa Abloy Group company.
 2. Curries Company; an Assa Abloy Group company.
 3. Pioneer Industries, Inc.
 4. Republic Doors and Frames.
 5. Steelcraft; an Ingersoll-Rand company.
- B. Source Limitations:
1. Obtain hollow-metal work from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by UL LLC for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
 2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
 3. Fire doors and frames shall contain a permanent, serialized label which shows the manufacturer's name and address, the FM Approval mark, the words "Fire Door," an hourly rating and the fire test designation. Temperature transmission ratings may also be shown. Refer to the introduction for each individual door type as some door types may require additional information. The labels may be metal (etched or embossed) secured to the door with rivets or welding, or self-adhered mylar labels. The labels denoting FM Approval shall be applied to the products at the manufacturing facility.
 4. Fire doors that also meet UBC 7-2 (1997) shall also contain a permanent unserialized supplemental label which indicates that the door also has met the UBC 7-2 (1997) fire test designation. The labels may be metal (etched or embossed) secured to the door with rivets or welding, or self-adhered mylar labels. The supplemental labels shall be applied to the products at the manufacturing facility.
- B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by UL LLC for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- C. LEED Performance Requirements
1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide interior hollow metal door and frame products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 3. LEED Requirements: Provide hollow metal door and frame products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.

1. Physical Performance: Level B according to SDI A250.4.
2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
 - d. Edge Construction: Model 2, Seamless.
 - e. Core: Vertical steel stiffener.
3. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
 - b. Construction: Full profile back welded.
4. Exposed Finish: Prime.

A. Frames for Wood Doors: SDI A250.8, Level 2.

1. Physical Performance: Level B according to SDI A250.4.
2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
 - b. Construction: Face welded.
3. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm.)
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 (ZF120) coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Core: Polyurethane or Polyisocyanurate with Vertical steel stiffener.
 - 1) Thermal Performance: Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:
 - a) The U-factor not to exceed a rating of 0.36 Btu/hr·ft²·° F at a 15 mph wind with 0° F exterior temperature.
3. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
 - b. Construction: Full profile welded.
4. Exposed Finish: Prime.

2.5 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.6 FRAME ANCHORS

- A. Jamb Anchored.
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.7 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 35 percent.
- B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- D. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- E. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- F. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- G. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- H. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

- I. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- J. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- K. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel material, with no exposed insulation.
- L. Glazing: Comply with requirements in Section 08 80 00 "Glazing."
- M. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.8 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
 - 2. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
 - 3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
 - 4. Top Edge Closures: Close top edges of doors with seamless flush closures of same material as face sheets.
 - 5. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
 - 6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 - 7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Grout Guards (if required): Weld guards to frame at back of hardware mortises in frames to be grouted.
 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
 6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 7. Terminated Stops: Terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame. Provide where indicated on the Door Schedule.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Provide loose stops and moldings on inside of hollow-metal work.
 5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
- G. Head Reinforcement: Provide minimum of 0.093-inch- thick, steel channel or angle stiffener for opening widths more than 48 inches.

2.9 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
 2. Prime prior to application of stops, so that the entire door is coated.

2.10 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Metal-Stud Partitions with Openings Requiring Ratings and Temperature-Rise Limits: Solidly pack mineral-fiber insulation inside frames.
 - 4. Concrete and Masonry Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
 - 5. Exterior walls: Fill space between frames and wall with spray polyurethane foam insulation.
 - 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 7. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

- c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
 - C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
 - c. At Bottom of Door: 3/4 inch plus or minus 1/32 inch.
 - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
 - D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
 - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.
- 3.4 ADJUSTING AND CLEANING
- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
 - B. Remove grout and other bonding material from hollow-metal work immediately after installation.
 - C. Prime-Coat Touchup: Touchup of prime coat is specified in Division 09 "Painting" Sections.

END OF SECTION

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SECTION 08 11 16

ALUMINUM DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Interior aluminum frames for glazing installed in gypsum board partitions.
 - 2. Interior swinging aluminum doors.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 - 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 4. Division 08 Section "Flush Wood Doors" for wood doors installed in aluminum frames.
 - 5. Division 08 Section "Hardware" for door hardware not specified in the is Section.
 - 6. Division 08 Section "Glazing" for glass in interior aluminum doors and frames.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, fire-resistance rating, and finishes.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.

2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
- C. Shop Drawings: Include the following:
 1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 2. Locations of reinforcements and preparations for hardware.
 3. Details of each different wall-opening condition.
 4. Details of anchorages, joints, field splices, and connections.
 5. Details of accessories.
 6. Details of moldings, removable stops, and glazing.
 7. Details of conduits and preparations for power, signal, and control systems.
- D. Samples for Initial Selection: For units with factory-applied finishes.
 1. Include similar Samples of seals, gaskets, and accessories involving color selection.
- E. Samples for Verification: For interior aluminum frames, prepared on Samples of size indicated below:
 1. Framing Member: 12 inches (300 mm) long.
 2. Corner Fabrication: 12-by-12-inch- (300-by-300-mm-) long, full-size window corner, including full-size sections of extrusions with factory-applied color finish.
- F. Schedule: For interior aluminum frames. Use same designations indicated on Drawings. Coordinate with window schedule and glazing.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of interior aluminum frame.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For interior aluminum frames to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain interior aluminum frames from single source from single manufacturer.
- B. Smoke- and Draft-Control Assemblies: Where indicated, provide assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring aluminum doors and frames.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver interior aluminum frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic. Store interior aluminum frames under cover at Project site.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Frames: Frames for fire-rated door assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Oversize Fire-Rated Frames: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that frames comply with standard construction requirements for tested and labeled fire-rated frames except for size.
 - 2. Frames for Smoke- and Draft-Control Assemblies: Tested according to UL 1784 and installed in compliance with NFPA 105.

- a. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (0.9 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa).

B. LEED Performance Requirements

1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
2. Provide interior aluminum metal door and frame products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.2 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Raco Interior Products, Inc. Solutions II System with fixed throat frames to accommodate wall thicknesses of 4 7/8-inch; with applied full face trim width as indicated, or comparable product by one of the following:
1. Advanced Architectural Frames.
 2. Custom Components Company.
 3. Dual Lock Partition Systems, Inc.; Avalon International Aluminum.
 4. DIRTT Environmental Solutions.
 5. Frameworks Manufacturing.
 6. Modulex, Inc.
 7. RACO Interior Products, Inc.
 8. Western Integrated Materials, Inc.
 9. Wilson Partitions.
 10. Versatrac.

2.3 COMPONENTS

- A. Aluminum Framing: ASTM B 221 (ASTM B 221M), Alloy 6063-T5 or alloy and temper required to suit structural and finish requirements, not less than 0.062 inch (1.6 mm) thick.
- B. Door Frames: Extruded aluminum, reinforced for hinges, strikes, and closers.
- C. Glazing Frames: Extruded aluminum, for glazing thickness indicated.
- D. Ceiling Tracks: Extruded aluminum.
- E. Trim: Extruded aluminum, not less than 0.062 inch (1.6 mm) thick, with removable snap-in glazing stops without exposed fasteners.

2.4 DOORS

- A. Materials: Extruded architectural aluminum 6063-T5 alloy and temper.
1. Thickness: Nominal .125 (3.2) inch.
 2. Stile size: As indicated on the Drawings.
 3. Top rail size: As indicated on the Drawings.
 4. Bottom rail size: As indicated on the Drawings.

- B. Screws, nuts, washers, bolts, rivets and other fastening devices: Aluminum, stainless steel or other noncorrosive materials.
- C. Construction: Door stiles and rails shall be tubular sections accurately joined at corners with concealed reinforcement brackets secured with bolts, screws and adjustable bottom rail. Doors shall have snap-in stops with E.P.D.M. glazing gasket on both sides of the glass. No exposed screws shall be permitted.

2.5 ACCESSORIES

- A. Fasteners: Aluminum, nonmagnetic, stainless-steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.
- B. Door Silencers: Manufacturer's standard continuous mohair, wool pile, or vinyl seals in color matching the frames.
- C. Smoke Seals: Intumescent strip or fire-rated gaskets in color matching the frames.
- D. Glazing Gaskets: Manufacturer's standard extruded or molded plastic, to accommodate glazing thickness indicated.
- E. Glazing: Comply with requirements in Division 08 Section "Glazing."
- F. Recessed and Exposed Glazing Channels: Aluminum extrusions complying with ASTM B 221, 6063-T5 alloy and temper G.S. 10A-T5, clad with stainless-steel sheet, with manufacturer's standard continuous roll-in glazing gaskets retained in extrusion races.
 - 1. Stainless steel finish: #4 directional polish.

2.6 DOOR HARDWARE

- A. Swinging Door Hardware: Provide complete with the following hardware in US 26D/US 32D finish: butts, exposed overhead closer, Lock set. Provide according to the requirements of Section 08 71 00 Door Hardware to match other devices in project.

2.7 FABRICATION

- A. Provide concealed corner reinforcements and alignment clips for accurately fitted hairline joints at butted or mitered connections.
- B. Factory prepare aluminum frames to receive templated mortised hardware; include cutouts, reinforcements, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Section 087100 "Door Hardware."
 - 1. Locate hardware cutouts and reinforcements as required by fire-rated label for assembly.
- C. Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.
 - 1. Locate removable stops on the inside of spaces accessed by keyed doors.

- D. Fabricate components as required to receive sealed glass units with integral blinds specified in Division 08 Section "Glazing".
- E. Fabricate components to allow secure installation without exposed fasteners.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, floors, and ceilings, with Installer present, for conditions affecting performance of the Work.
- B. Verify that wall thickness does not exceed standard tolerances allowed by throat size indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install interior aluminum frames plumb, rigid, properly aligned, and securely fastened in place; comply with manufacturer's written instructions.
 - 1. At fire-protection-rated openings, install fire-rated frames according to NFPA 80 and NFPA 105.
- B. Install frame components in the longest possible lengths; components up to 96 inches (2450 mm) long must be one piece.
 - 1. Use concealed installation clips to produce tightly fitted and aligned splices and connections.
 - 2. Secure clips to extruded main-frame components and not to snap-in or trim members.
 - 3. Do not leave screws or other fasteners exposed to view when installation is complete.
- C. Doors: Fit doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Steel Doors:

- a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 - b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
 - c. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
 - d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
2. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing Channels: Install recessed and exposed glazing channels according to Manufacturer's instructions, and as indicated.
 - E. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with aluminum frame manufacturer's written instructions.
- ### 3.3 CLEANING
- A. Clean exposed frame surfaces promptly after installation, using cleaning methods recommended by frame manufacturer and according to AAMA 609 & 610.
 - B. Touch up marred frame surfaces so touchup is not visible from a distance of 48 inches (1220 mm). Remove and replace frames with damaged finish that cannot be satisfactorily repaired.

END OF SECTION

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SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with plastic laminate faces.
2. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

A. Related Sections:

1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Section 08 11 13 "Hollow Metal Doors and Frames" for hollow metal frames for flush wood doors.
5. Section 08 70 00 "Door Hardware" for door hardware for flush wood doors.
6. Section 08 80 00 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of door indicated. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Composite Wood Products.
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
1. Indicate dimensions and locations of mortises and holes for hardware.
 2. Indicate dimensions and locations of cutouts.
 3. Indicate requirements for veneer matching.
 4. Indicate doors to be factory finished and finish requirements.
 5. Indicate fire-protection ratings for fire-rated doors.
- D. Samples for Verification:
1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish.
 2. Corner sections of doors, to show construction detail approximately 5 by 5 inches (127 by 127 mm), with door faces and edges representing actual materials to be used.
 3. Louver blade and frame sections, 6 inches (150 mm) long, for each material and finish specified.
 4. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Source Limitations: Obtain flush wood doors from single manufacturer. Wood flitches shall be controlled by cabinet millworker for matching woodwork, doors, paneling, and other wood veneer items.
- C. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated." and WDMA I.S.1-A, "Architectural Wood Flush Doors" whichever is stricter
 - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
- D. Preinstallation Conference: Conduct conference at Project site.
- E. Mockups: Provide metal fabrications for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - 1. Build mockups of typical wood doors.
 - 2. See Section 01 43 39 "Room Mockup requirements" for room mockups requiring wood Doors.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.

2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Algoma Hardwoods, Inc.
 2. Eggers Industries.
 3. Graham; an Assa A bloy Group company.
 4. Marshfield Door Systems, Inc.
 5. VT Industries Inc.

2.2 DOOR CONSTRUCTION, GENERAL

- A. LEED Requirements: Provide wood door products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
- B. Certified Wood: Fabricate doors with wood products and plastic laminate produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- C. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- D. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Recycled Content of Medium-Density Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.
- F. Crossbands: Hardwood veneer with a minimum thickness of 1/8-inch (3.2 mm). Crossbands and face veneers shall be laminated to the core with Type 1 waterproof glue. Crossbands must extend the full width of the door and have grain direction at 90° to the face of the door. Minimum properties include internal bond minimum of 220 psi (1.52 MPa). Synthetic crossbands of either fiberwood or particleboard are not permitted unless they meet minimum internal bond of 220 psi (1.52 MPa).
- G. Rails (Horizontal Edges): Solid lumber - hardwood or softwood, with grain running perpendicular to stiles.
- H. Stiles (Vertical Edges)
 1. ABS edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
 2. Vertical Edges can be one piece or laminated hardwood lumber.

- I. WDMA I.S.1-A Performance Grade:
 - 1. Heavy Duty unless otherwise indicated.
 - 2. Extra Heavy Duty: Where indicated.
- J. Structural-Composite-Lumber-Core Doors:
 - 1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).

2.3 PLASTIC-LAMINATE-FACED DOORS

- A. Interior Solid-Core Doors:
 - 1. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards (AWS)" for grades of wood doors indicated for construction, finishes, installation, and other requirements.
 - 2. Provide labels and certificates from AWI certification program indicating that paneling, complies with requirements of grades specified.
 - 3. The cabinet millworker shall be the controller of wood flitches for all matching woodwork, doors, paneling, etc. Other fabricators shall obtain flitches from cabinet millworker and supplier.
 - 4. Grade: Premium.
 - 5. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS.
 - 6. Colors, Patterns, and Finishes: As indicated in the Materials Legend on the Drawings.
 - 7. Exposed Vertical and Top Edges: ABS Edge banding that matches faces, applied before faces.
 - 8. Core: Particleboard, structural composite lumber or mineral as applicable.
 - 9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before faces and crossbands are applied. Faces are bonded to core using a hot press.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Dimensional Tolerances:
 - 1. Width: Plus or minus 1/32 inch (0.794-mm).
 - 2. Height: Plus or minus 1/16 inch (1.59-mm).
 - 3. Thickness: Plus or minus 1/32 inch (0.794-mm).
 - 4. Hardware Location: Plus or minus 1/64 inch (0.397-mm).
 - 5. Locks and Hinges: Minus 0 or plus 1/64 inch (0.397-mm).

- D. Flushness of Plant Assembled Joints:
 - 1. No variations between adjacent flat or molded surfaces.
 - 2. No show-through or telegraphing of substrates in the finish work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 08 71 00 "Door Hardware" and Section 08 71 01 "Door Hardware Schedule".
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Replace doors that are damaged or that do not comply with requirements.

END OF SECTION

SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Access doors and frames for walls and ceilings.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:

- c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Composite Wood Products.
 - 4) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings:
- 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- D. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.
- E. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
 - 2. NFPA 288 for fire-rated access door assemblies installed horizontally.
- B. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Access Panel Solutions.
 2. Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
 3. Jensen Industries; Div. of Broan-Nutone, LLC.
 4. Maxam Metal Products Limited.
 5. Babcock-Davis.
 6. JL Industries, Inc.; a division of the Activar Construction Products Group.
 7. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 8. Nystrom, Inc.
- B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.
- C. Flush Access Doors with Concealed Flanges:
1. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
 2. Locations: Where indicated.
 3. Door Size: As indicated.
 4. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage.
 - a. Finish: Factory prime.
 5. Frame Material: Same material and thickness as door.
 6. Hinges: Manufacturer's standard.
 7. Hardware: Lock.
- D. Flush Stainless-steel Access Doors with Exposed Flanges:
1. Assembly Description: Fabricate door to fit flush to frame. Provide frame with exposed flange.
 2. Locations: Where indicated.
 3. Door Size: As indicated.
 4. Stainless-Steel Sheet for Door: Nominal 0.060 inch, 16 gage.
 - a. Type: 304
 - b. Finish: #4 directional polish.
 5. Frame Material: Same material and thickness as door.
 6. Hinges: Manufacturer's standard.
 7. Hardware: Lock.
- E. Fire-Rated, Flush Access Doors with Concealed Flanges:
1. Assembly Description: Fabricate door to fit flush to frame, uninsulated. Provide self-latching door with automatic closer and interior latch release. Provide frame with gypsum board beads for concealed flange installation.
 2. Locations: Where indicated.
 3. Fire-Resistance Rating: Not less than that indicated.
 4. Temperature-Rise Rating: 450 deg F at the end of 30 minutes.
 5. Uncoated Steel Sheet for Door: Nominal 0.036 inch, 20 gage.
 - a. Finish: Factory prime.
 6. Frame Material: Same material, thickness, and finish as door.
 7. Hinges: Manufacturer's standard.
 8. Hardware: Lock.

- F. Ceiling Doors with GRG access panels:
 - 1. Material: Glass fiber reinforced gypsum
 - 2. Shell thickness: 5/8" lightweight gypsum
 - 3. Edge thickness: The panel has an edge thickness to accommodate 5/8" drywall
 - 4. Finish: Match adjacent gypsum finishes.
 - 5. Flame Spread (ASTM E84-80): 0
 - 6. Smoke Index (ASTM E84-80): 0
 - 7. Combustion (ASTM E84-80) - Non-Combustible Class A Non-Rated.

- G. Hardware:
 - 1. Lock: As indicated in schedule.
 - a. Lock Preparation: Prepare door panel to accept cylinder specified in Section 087100 "Door Hardware."

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

- C. GRG, glass fiber reinforced gypsum, ceiling access doors designed to blend seamlessly into drywall ceiling.

- D. Frame Anchors: Same type as door face.

- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 - 1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
 - 2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
 - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
 - 2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil for topcoat.
- E. Stainless-Steel Finishes:
 - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
 - 2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - a. Run grain of directional finishes with long dimension of each piece.
 - 3. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08 42 43

INTENSIVE CARE UNIT/CRITICAL CARE UNIT (ICU/CCU) ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes manually operated ICU/CCU entrances.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification
- C. Related Requirements:
 - 1. Section 01 23 00 "Alternates" for bidding alternates.
 - 2. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 - 3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 4. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 5. Section 08 11 16 "Aluminum Doors and Frames" for other swinging interior aluminum doors and frames.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for ICU/CCU entrances.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
- C. Shop Drawings: For ICU/CCU entrances, show the following:
1. Elevations of each door design.
 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Locations of reinforcement and preparations for hardware.
 5. Details of each different wall opening condition.
 6. Details of anchorages, joints, field splices, and connections and attachments to other work.
 7. Details of accessories.
 8. Details of moldings, removable stops, and glazing.
- D. Schedule: Provide a schedule of ICU/CCU entrances prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware and hollow metal and wood door schedules.
- E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For qualified Installer.

- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
- C. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain ICU/CCU entrances from single source from single manufacturer.
- C. Preinstallation Conference: Conduct conference at Project site.
- D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring ICU/CCU doors.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings to receive ICU/CCU entrances by field measurements before fabrication.

1.6 COORDINATION

- A. Templates: Distribute for doors, frames, and other work specified to be factory prepared for installing ICU/CCU entrances.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of ICU/CCU entrances that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Faulty operation of hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Besam Entrance Solutions; an ASSA ABLOY Group company; VersaMax.
 - 2. Horton Automatics; a division of Overhead Door Corporation; Profiler Smoke Swing.
 - 3. Stanley Access Technologies; Division of The Stanley Works; Dura Care 7400.
 - 4. Dorma.

2.2 PERFORMANCE REQUIREMENTS

- A. Opening Force: Not more than 5 lbf (22.2 N) to fully open door.
- B. Air Leakage: Entrance assemblies for smoke control shall be listed and labeled for smoke and draft control by qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and having maximum air leakage according to NFPA 105 unless otherwise indicated.
- C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Recycled Content of Aluminum Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 35 percent.

2.3 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - 2. Sheet and Plate: ASTM B 209 (ASTM B 209M).
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness, in entrance manufacturer's standard thickness.
- C. Sealants and Joint Fillers: As specified in Division 07 Section "Joint Sealants."
- D. Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout complying with ASTM C 1107; of consistency suitable for application.
- E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 ICU/CCU ENTRANCE ASSEMBLIES

- A. General: Provide manufacturer's standard factory-glazed ICU/CCU entrances including door leaves, sidelites, framing, headers, carrier assemblies, roller tracks, and accessories required for a complete installation.

- B. ICU/CCU Entrance [**ICU-1**]: Based on Besam products.
1. Performance: Smoke-control assembly.
 2. Configurations:
 - a. Type: **ICU**.
 - 1) 2 Panel Swing - Manual.
 - 2) Versamax Smoke Rated Manual Swing Door System.
 - 3) Un-equal pair RH-LH Active or LH-RH Active.
 3. Mounting: As indicated.
 4. Finish: Finish framing, door(s), sidelite(s), and header with factory applied finish.
- C. ICU/CCU Entrance [**ICU-2**]: Based on Besam products.
1. Performance: Smoke-control assembly.
 2. Configurations:
 - a. Type: **ICU**.
 - 1) 2 Panel Swing – Manual, self-closing.
 - 2) Versamax Smoke Rated Manual Swing Door System.
 - 3) Un-equal pair RH-LH Active or LH-RH Active.
 3. Mounting: As indicated.
 4. Finish: Finish framing, door(s), sidelite(s), and header with factory applied finish.

2.5 COMPONENTS

- A. Framing and Transom Members: Manufacturer's standard extruded aluminum, minimum 0.125 inch (3.2 mm) thick and reinforced as required to support imposed loads.
1. Nominal Size: 1-3/4 by 4-1/2 inches (45 by 115 mm).
 2. Extruded Glazing Stops and Applied Trim: Minimum 0.062-inch (1.6-mm) wall thickness.
- B. Stile and Rail Doors: Manufacturer's standard 1-3/4-inch- (45-mm-) thick glazed doors with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular stile and rail members. Mechanically fasten corners with reinforcing brackets that are welded, or incorporate concealed tie rods that span full length of top and bottom rails.
1. Glazing Stops and Gaskets: Snap-on, extruded-aluminum stops and preformed gaskets for glazing indicated.
 2. Stile Design: Narrow stile; 2 1/8-inch (54-mm) nominal width.
 3. Rail Design: 4-inch (125-mm) nominal height.
 4. Bottom Rail: 4-inch (125-mm) nominal height.
 - a. Doors with closer: 10 inch height.
 5. Muntin Bars: Horizontal tubular rail member for each door; match stiles.
 - a. Alternate Muntin Bars: Do not provide Horizontal tubular rail member with alternate glazing with integral blinds or Switchable electrochromic privacy glass.
- C. Glazing:
1. Laminated safety glass, as specified in Division 08 Section "Glazing."

2. Alternate Glazing, Glass Type 31: Integral Blinds, Glass to have blinds installed between glass lites, provide manufacturer's standard product, with thumbwheel tilt operation.
 3. Alternate Glazing, Glass Type 32: Switchable electrochromic privacy glass, as specified in Division 08 Section "Switchable Glass."
 4. Alternate Glazing with Decorative Film Glass Type 33: Laminated safety glass, as specified in Division 08 Section "Glazing." with Decorative window film, as specified in Division 08 Section "Decorative Glass Glazing."
- D. Brackets and Reinforcements: Manufacturer's standard, high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.6 HARDWARE

- A. General: Provide units in sizes and types recommended by ICU/CCU entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish unless otherwise indicated.
- B. Hinges: Half mortise, gear type, continuous hinge; allows 180° swing.
- C. Overhead door stops to limit the active door(s) from swinging past 90 degrees.
- D. Latching hardware shall be provided as indicated.
1. Active Door Leaves: Concealed top and bottom vertical rods. Bottom rod to serve as a counter balance mechanism, factory adjusted so that it does not extend below the bottom of the rail.
 2. Push Side: Push paddle.
 3. Pull Side: Curved lever handle.
 4. Inactive Leaf: Manual operated flush bolt.
- E. Closers: An adjustable speed, surface mounted, rack and pinion door closer, which will close door to a positive latched position.
1. Door closer(s) are to have non-hold open type arm.
- F. Manual Flush Bolts: BHMA A156.16, Grade 1, edge mortised, lever-extension type; located at bottom of each swing-out sidelite.
- G. Deadlocks: Manufacturer's standard, operated by exterior cylinder and interior thumb turn.
1. Deadbolts: Laminated-steel hook, mortise type, BHMA A156.5, Grade 1.
 2. Cylinders: As specified in Division 08 Section "Door Hardware."
- H. Weather Stripping: Manufacturer's standard replaceable components.
1. Compression Type: ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
- I. Weather Sweeps: Manufacturer's standard, smoke and air pressure seal sweep mounted to underside of door bottom.

- J. Power transfer device: Provide if Alternate for switchable electrochromic privacy glass is selected.

2.7 FABRICATION

- A. General: Factory fabricate ICU/CCU entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
 - 1. Fabricate aluminum components before finishing.
 - 2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
 - 3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match framing, fabricated from stainless steel.
 - a. Where fasteners are subject to loosening or turning out from structural movements or vibration, use self-locking devices.
 - b. Reinforce members as required to receive fastener threads.
 - 4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- B. Framing: Provide ICU/CCU entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
 - 1. Fabricate tubular and channel frame assemblies with manufacturer's standard welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
 - 2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 - 3. Form profiles that are straight and free of defects or deformations.
 - 4. Provide components with concealed fasteners and anchor and connection devices.
 - 5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
 - 6. Provide anchorage and alignment brackets for concealed support of assembly from the building structure.
- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.
- D. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, according to GANA's "Glazing Manual."
- E. Hardware: Factory install hardware to the greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.
- F. Electrical Grounding: Fabricate ICU/CCU entrances to be internally grounded, complying with requirements of authorities having jurisdiction.

2.8 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of ICU/CCU entrances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
 - 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous coating.
- B. Install ICU/CCU entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 - 1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
 - 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
 - 3. Level recesses for recessed floor tracks using shrinkage-resistant grout.
 - 4. Air Leakage: Install entrance assemblies for smoke-control according to NFPA 105 and as indicated.

- C. Sealants: Comply with requirements in Division 07 Section "Joint Sealants" for installing sealants, fillers, and gaskets.
 - 1. Set framing members, floor tracks, and flashings in full sealant bed.
 - 2. Seal perimeter of framing members with sealant.
- D. Grounding: Connect ICU/CCU-entrance, electrical grounding systems to building grounding system as specified in Division 26 Section "Grounding and Bonding for Electrical Systems."
- E. Wiring: Coordinate with Electrical if Alternate for switchable electrochromic privacy glass is selected.

3.3 ADJUSTING

- A. Adjust operating hardware and moving parts for smooth and safe operation; lubricate as recommended by manufacturer.
- B. Adjust force to open swing panels.
- C. Test grounding system for compliance with requirements of authorities having jurisdiction.
- D. Adjust smoke-control and pressurized-entrance doors for tight closure.

3.4 CLEANING AND PROTECTION

- A. Clean glass and metal surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.
- B. Comply with requirements in Division 08 Section "Glazing" for cleaning and protecting glass.

END OF SECTION

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SECTION 08 44 13

GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Section includes glazed aluminum curtain walls with glazing retained mechanically with gaskets on four sides.
2. Mockup of Aluminum Framed Curtain Wall.
3. Structural Design and Calculations for Glazed Aluminum Curtain Wall.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 23 00 "Alternates" for bidding alternates included in this Section.
2. Section 01 45 34 "Mockups for Exterior Wall Systems" for visual mockups.
3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
4. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
5. Section 01 91 19 "Building Enclosure Commissioning" for building enclosure commissioning procedures.
6. Section 01 91 19A "Building Enclosure Commissioning Appendix A" for building enclosure systems to be commissioned.
7. Division 07 Section "Fire Resistive Joint Systems" for perimeter fire and smoke containment system safing insulation, and for curtain wall insulation.

1.2 PERFORMANCE REQUIREMENTS

- ###### A. Design:
- The curtain wall shall be designed as a pressure equalized rain screen, comprised of a continuous and uninterrupted exterior weather seal, interior air seal, and a pressure-equalized drainage system throughout, including all perimeter conditions and connections to adjacent construction. The curtain wall shall include an internal drainage system capable of managing water penetration and condensation, and draining water to the exterior.

- B. General Performance: Comply with performance requirements specified, as determined by testing manufacturer's standard of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Glazed aluminum curtain walls shall withstand movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Delegated Design:
1. Design glazed aluminum curtain walls, including comprehensive engineering analysis by a qualified Structural (*Professional*) Engineer, using structural performance requirements and design criteria indicated herein.
 2. The Contractor is responsible for the engineering and design of all components and materials, as well as the installation of the Glazed Aluminum Curtain Wall System.
 3. Design glazed aluminum curtain walls to meet American Society of Civil Engineers (ASCE) 7-98 for enclosed buildings and in accordance with FMG Data Sheet 1-28, Wind Design. Criteria shall consider respective building heights, wind importance factor of 1.15, design wind speed of 95 mph, 3 second peak gust with a Ground Roughness Exposure C.
- D. Structural Loads:
1. Wind Loads: As indicated.
 2. Periodic Maintenance-Equipment Loads: As indicated on Drawings.
 3. Seismic Design Data: As indicated on the Structural Drawings.
 4. East Tower (102 ft. 10 in.): Inward and outward forces of 31.1 psf in the field (Zone 4), inward force of 31.1 psf in the corners (Zone 5) and an outward force of 56.9 psf in the corners of the wall.
 - 5.
- E. Structural-Test Performance: Provide glazed aluminum aluminum curtain walls tested according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Deflection of Framing Members: At design wind pressure, as follows:
1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to **13 feet 6 inches (4.1 m)** and to 1/240 of clear span plus **1/4 inch (6.35 mm)** for spans greater than **13 feet 6 inches (4.1 m)** or an amount that

- restricts edge deflection of individual glazing lites to **3/4 inch (19 mm)**, whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to $L/360$ of clear span or **1/8 inch (3.2 mm)**, whichever is smaller.
 - a. Operable Units: Provide a minimum **1/16-inch (1.6-mm)** clearance between framing members and operable units.
 3. Cantilever Deflection: Where framing members overhang an anchor point, limit deflection to 2 times the length of cantilevered member divided by 175.
 4. Framing at edges of insulating glass: Deflection shall not exceed $D_g=0.4(L_g/100)^2$, where L_g is the length in inches of the glass edge supported.
 5. Framing at edges of monolithic glass: Deflection shall not exceed $D_g=0.6(L_g/100)^2$, where L_g is the length in inches of the glass edge supported.
 6. Framing at edges of glass: Deflection normal to the plane of construction, measured over the length of the individual glass edge supported, shall not exceed $1/175$ of that length or **3/4 inch**, whichever is less. Minimum requirements for gasket compression and glass bite shall be maintained at all times under applied loads acting normal to or in the plane of construction.
 7. Glass lites: Deflection at center of glass lites shall not exceed $1/60$ of the span between framing members or **1 inch**, whichever is less. Deflection at 1.5 times design wind load shall be limited to prevent disengagement from the framing.
 8. Metal panels: Deflection at center of panels shall not exceed $1/120$ of the clear span of the face material between supporting or stiffening members. This deflection shall be measured relative to the actual (deflected) position of the supporting members.
 9. Louver blades: Deflection in the plane of construction shall not exceed $1/360$ of the span between structural supports, or **1/8 inch**, whichever is less.
- G. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
1. Component Importance Factor is 1.25.
 2. Acceptable level of damage:
 - a. Continued operation: The building enclosure system components remain in the same condition after the design level event as they were prior with little or no repair or replacement.
 - b. Glass in the glazed curtain walls and storefronts will perform according to requirements by NEHRP Recommended Seismic Provisions (FEMA P-750) for immediate occupancy and life-safety performance objectives that include the following:
 - 1) Glass remains unbroken in its frame and anchorage.
 - 2) Glass cracks but remains in its frame or anchorage while continuing to provide a weather barrier, and to be otherwise serviceable.
- H. Story Drift: Accommodate design displacement of adjacent stories indicated.
1. Design Displacement: As indicated on Drawings, if not indicated, request data from Architect.
 2. Test Performance: Meets criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.

- I. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft. (718 Pa). Pressure shall not be reduced for field testing.
 - 1. Water penetration is defined as any uncontrolled water, other than condensation, that appears on the curtain wall or on any surface inside the concealed spaces of the curtain wall or adjacent construction not designed specifically to function as a part of the rainwater management system for the Building enclosure. The inner surface of the curtain wall is defined as any surface inboard of a vertical plane formed by the innermost plane of the glazing. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.
- J. Water Penetration under Dynamic Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to AAMA 501.1 at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft. (718 Pa).
 - 1. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.
- K. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
 - 2. Test Interior Ambient-Air Temperature: 75 deg F (24 deg C).
 - 3. Test Performance: No buckling, stress on glass, sealant failure, or excess stress on framing, anchors, and fasteners and no reduction of performance when tested according to AAMA 501.5.
- L. Energy Performance: Glazed aluminum curtain walls shall have energy performance ratings according to NFRC.
 - 1. Thermal Transmittance (U-Factor): Fixed vision glazing and framing areas shall have U-factor of not more than that accepted in Writing by the Architect as sufficient to meet the Project energy and sustainable design goals, as determined according to NFRC 100.
 - a. With base bid glazing vision area:
 - 1) U = 0.33 (NFRC standard size).
 - 2) U = 0.30 (Specified size).
 - b. With alternate triple glazing vision area: U = 0.20.
 - 2. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft..
 - 3. Air Infiltration: Average air leakage not to exceed 0.04 cfm/ft² under a pressure differential of 0.3 in. w.g. (1.57psf) when tested in accordance with ASTM E 2357 ASTM E 1677, ASTM E 1680 or ASTM E283.
 - 4. Condensation Resistance: Fixed glazing and framing areas shall have condensation resistance, such that no visible condensation occurs on the glass or frames, within the design temperature and humidity parameters, and the interior conditions indicated in the Quality Assurance article Thermal Modeling paragraph.

- M. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than the following as determined according to NFRC 200:
 - 1. Base bid: 0.35.
 - 2. Alternate: 0.25
- N. Sound Transmission: Fixed glazing and framing areas shall have the following sound-transmission characteristics:
 - 1. Outdoor-Indoor Transmission Class: Minimum 35 when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.
- O. Anchors and Connections:
 - 1. Anchors, connections and assemblies connecting the curtain wall components and associated fabrications to the supporting construction are shown on the Drawings as suggested locations for the curtain wall manufacturer/installer's information. The curtain wall manufacturer/ installer is responsible for the structural design of the connections and anchors, including all connecting hardware, accessories and reinforcing necessary for fabrication, and installation of the curtain wall system and associated fabrications.
 - 2. The curtain wall manufacturer is to notify the Architect in writing prior to the submittal of shop drawings of any changes in the proposed locations of connections and anchors.
 - 3. The Architect's review of shop drawings is not to be construed as removing responsibility from the curtain wall manufacturer/installer for structural failures related to design, fabrication, installation and fabrication service.

1.3 BID SUBMITTALS

- A. The following submittals are to be made with the proposal:
 - 1. Qualification data.
 - 2. Product test reports:
 - a. Structural tests.
 - b. Acoustical Tests.
 - c. Thermal tests.
 - d. Thermal modeling.

1.4 ACTION SUBMITTALS

- A. Sequential Review: This Specification Section requires review of submittals by Architect's Consultants, Owner, Owner's insurer and other parties. Allow 20 days for initial review of each submittal.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- D. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 3. Provide shop drawings with seal and signature of Structural (Professional) Engineer currently registered in the State of Maine. Provide the same engineer who prepares and signs the design calculations.
 4. Include shop drawings for mockups.
- E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:
1. Joinery, including concealed welds.
 2. Anchorage.

3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

1.5 INFORMATIONAL SUBMITTALS

- A. Delegated-Design Submittal: For glazed aluminum curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 1. Design Calculations: Submit structural calculations prepared by a *Structural (Professional)* Engineer licensed in the *State of Maine*, showing compliance with the specified performance criteria.
- B. Qualification Data: For qualified Manufacturer, Installer, preconstruction testing agency and testing agency.
- C. Evaluation Reports: For Aluminum Framed Curtain Wall: ICC report.
- D. Seismic Qualification Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
- E. Welding certificates.
- F. Energy-Performance Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.
 1. Basis for Certification: NFRC-certified energy-performance values for each glazed aluminum curtain wall.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency, for glazed aluminum curtain walls, indicating compliance with performance requirements.
- H. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.
- I. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals. Include ASTM C 1401 recommendations for postinstallation-phase quality-control program.
- J. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An experienced manufacturer capable of fabricating glazed aluminum curtain walls that meet or exceed energy performance requirements indicated and of documenting this performance by certification, labeling, and inclusion in lists.
- B. Fabricator/Installer Requirements: Provide curtain wall systems and associated items by a firm having undivided responsibility for the entire curtain wall system design, fabrication and installation as shown on the Drawings and specified herein as evidenced by not less than five (5) years experience in fabricating and installing the proposed curtain wall.

- C. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- D. Testing: Where manufacturer's standard curtain wall system complies with performance and test requirements and has been tested by an independent laboratory in accordance with the specified tests, provide test reports and certification by manufacturer showing compliance with such tests. Test reports shall not be older than five (5) years. When no tests exist, perform required tests through a recognized independent testing laboratory or agency and provide certified test report results.
- E. Design Calculations: The curtain wall fabricator/installer shall submit design calculations to substantiate performance requirements specified herein, prepared by, signed and sealed by a Structural (Professional) Engineer licensed in the State of Maine. Calculations will not be reviewed by the Architect but are submitted for information purposes only and as evidence that the curtain wall fabricator/installer has engaged a structural engineer to provide them. The curtain wall fabricator/installer shall bear full responsibility for engineering the curtain wall design to comply performance requirements. Test reports are not an acceptable substitute for design calculations.
- F. Product Options: Information on Drawings and in the Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated on the Drawings by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines and relationships to one another and to adjoining construction. Performance characteristics are indicated by criteria specified herein subject to verification as specified.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's written approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect in accordance with Section 01 60 00 "Product Requirements" for review prior to submittal of shop drawings.
- G. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
- H. Post Installed Anchors: Meet the requirements of Section 03 15 10 "Post Installed Anchors" including Field Quality Control
- I. Energy-Performance Standards: Comply with NFRC for minimum standards of energy performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
- J. Thermal Modeling:
 - 1. Provide thermal modelling as required to demonstrate energy code compliance or to validate assumptions in energy model used for compliance path.
 - 2. Provide finite element computer thermal modeling using latest version of THERM and WINDOW software as developed by Lawrence Berkley National Laboratory. Include in analysis all principal members, including internal

mullion reinforcing, for sill, jamb, head and mullion conditions for vision lites and for spandrel panels, including adjacent building substrates for masonry, precast concrete and metal panel wall conditions. Analysis is to be completed under the conditions listed below. The intent is to evaluate the curtain wall system assemblies and conditions of installation to determine if or where surface temperatures will drop below the dew point temperature.

- a. Parameters for Curtain Walls:
 - 1) Exterior T = -10 deg F
 - 2) Interior T = 72 deg F
 - 3) Max interior RH = 30%
 - 4) Wind speed: 15 MPH
 3. Provide at a minimum, thermal modeling for each Type of curtain wall, in the locations:
 - a. Head.
 - b. Jamb.
 - c. Sill.
 - d. Interior mullion; spandrel – spandrel, including shadow box back pan and insulation.
 4. Thermal modeling at other conditions: The Manufacturer/Fabricator is responsible for the performance of the curtain wall system. Additional thermal modeling at conditions which may vary the thermal performance of the system such as stack joints, anchors and interior mullion conditions are recommended to assure the Manufacturer/Fabricator of system performance.
- K. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. See Section 01 45 34 "Mockups For Exterior Wall Systems."
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- L. Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.

- e. Failure of operating components.
 - f. Sealant (including structural silicone) loss of adhesion, loss of cohesion, cracking or discoloration.
 2. Warranty Period: 10 years from date of Substantial Completion.
 3. Installer Warranty Period: 2 years from date of Substantial Completion.
 - B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Warranty Period: 20 years from date of Substantial Completion.
 - C. Special Warranty for Weatherseal Sealants: Provide warranty for weatherseal sealants materials and installation as required in Specification Section 07 90 00 Sealants.
- 1.9 COORDINATION
- A. Coordinate installation of curtain Walls with Division 07 Section for air barriers

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with requirements, provide Schuco 60 .HI. or a comparable product by one of the listed manufacturers.
 1. Frame profile: 2.4 inches nominal (60 mm) face width, by 6 inches nominal (150 mm) depth, steel reinforcing as required by loads.
- B. Basis of Design Alternate Product: Subject to compliance with requirements, provide Schuco 60 .SI for triple glazing, or a comparable product by one of the listed manufacturers.
 1. Frame profile: 2.4 inches nominal (60 mm) face width, by 6 inches nominal (150 mm) depth, steel reinforcing as required by loads.
- C. Listed Manufacturers/Products: The following manufacturers may provide products, and alternate products when they are equal or better in performance than the basis of design products.
 1. Kawneer; 7500 Wall.
 2. Oldcastle Building Envelope; Reliance HTC.
 3. Wasau Window and Wall Systems; HP-Wall

2.2 MATERIALS

- A. LEED Performance Requirements
 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC)

- content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
2. Provide interior insulation products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 3. LEED Requirements: Provide glazed aluminum curtain wall products and louvers with Cradle to Cradle certification, at minimum version 2 Basic level or version 3 Bronze level or better.
 4. Provide glazed aluminum curtain wall products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Recycled Content of Aluminum Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 35 percent.
- D. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: **ASTM B 209 (ASTM B 209M)**.
 2. Extruded Bars, Rods, Profiles, and Tubes: **ASTM B 221 (ASTM B 221M)**.
 3. Extruded Structural Pipe and Tubes: ASTM B 429.
 4. Structural Profiles: ASTM B 308/B 308M.
 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- E. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
- F. Thermal Break: Glass-reinforced nylon
- 2.3 FRAMING
- A. Framing Members: Manufacturer's standard formed- or extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system, fabricated from Series 300 stainless steel.
- C. Anchors: Three-way adjustable anchors, with minimum adjustment of **1 inch (25.4 mm)**, that accommodate fabrication and installation tolerances in material and

finish and are compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- D. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.
- E. Framing Sealants: Manufacturer's standard sealants.
- F. Thermal isolator system with Uf values to 0.70 W/(m²K) including screw factor.
1. Isolators to be made of high density PVC co-extruded with Polyethylene foam on both sides and to be at least 3/4 inch (19 mm) in depth.
- G. Pressure Caps: Manufacturer's standard plastic pressure plate with reflective surfaces on the insulating strip and on the plastic pressure plate that mechanically retain glazing.
- H. Exterior Trim Covers (Pressure plate cover cap): Manufacturer's standard or custom extruded aluminum snap on covers for glazing pressure plates.
1. 3/4 to 7/8 inch depth (to face of glass) rectangular cover where indicated.
 2. Closures for locations where open end of cover would be exposed: Aluminum.
 3. Finish: Match framing unless otherwise indicated.
- I. Extruded Aluminum Interior Stools: 0.125 inch thickness, finished to match curtain wall.
- J. Formed Aluminum sills: 0.125 inch thickness, finished to match curtain wall.
- K. Stainless Steel Safety railing: Provide stainless steel safety railing in locations indicated, attach between mullions where indicated.
1. Material: 1 1/2 inch O. D. Stainless steel tubing, Type 304, #4 finish.
- L. Shadow box back pan: Provide 0.090-inch thickness back pans to encapsulate insulation at shadow box spandrel areas.
1. Color:
 - a. Visible through glazing: As selected by Architect from Manufacturer's standards.
 - b. Not visible through glazing: Mill finish.
- M. Shadow box back pan at perimeter fire-containment system: Provide 0.033-inch thickness galvanized steel back pans and stiffening angles to encapsulate insulation at shadow box spandrel areas fire-containment system.
- N. Glazed in aluminum panels:
1. Panel face: Aluminum sheet, 0.125 inch thickness, finished to match framing.
 2. Insulation: Mineral wool curtain wall insulation, thickness as indicated on the Drawings.
 3. Inner face and edges: Aluminum sheet, 0.050 inch thickness.
 4. Provide weeps.

2.4 GLAZING

- A. Glazing: Comply with Division 08 Section "Glazing."
- B. Glazing Gaskets, Spacers, Setting Blocks, Sealant Backings, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types compatible with sealants and suitable for joint movement and assembly performance requirements.
- C. Glazing Sealants: For glazed aluminum curtain walls, as recommended by manufacturer for joint type.
 - 1. Weatherseal Sealant: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by weatherseal-sealant, and glazed aluminum curtain-wall manufacturers for this use.
 - a. Color: As selected by the Architect from manufacturer's standard colors.

2.5 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Fixed, Perforated High Performance Extruded-Aluminum Louvers:
 - 1. Louver: Basis of Design C/S Perform Louver Model 7.5" (190.5) Deep High Performance Fixed Extruded Mullion Louver Model PL-4080.
 - a. Depth: 7.5" (190.5).
 - b. Perforated Face to be .125" perforated aluminum panel in single frame with 4" deep blades. Perforated element is face fastened to rear frame and supported by a .125" aluminum channel frame with mitered. Perforated face element shall be supported in rear as required to minimize deflection, warping, "oil canning" etc. and to comply with all engineering criteria.
 - c. Material: Aluminum with 2 coat fluoropolymer resin powder coat system
 - 1) Color: As selected by the Architect from industry standard colors.

2.6 ACCESSORY MATERIALS

- A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.
- B. Insulation: See Section 07 21 00 thermal insulation.
- C. High performance building insulation blanket: See Section 07 21 00 thermal insulation.
- D. Sill Splice Joint Seal: Pre-cured silicone membrane.
 - 1. Thickness: .0625 inches.
 - 2. Silicone adhesive: Manufacturer's standard silicone sealants.
 - 3. Weep hole baffles: U V Resistant reticulated polyurethane foam.
- E. Perimeter Transition Assembly: Subject to compliance with the requirements, provide Proglaze Engineered Transition Assembly (ETA), manufactured by Tremco, Inc., or a comparable assembly by one of the following:
 - 1. Dow Corning Corporation.
 - 2. Pre-engineered, silicone extrusion, with integral dart and/or single or double rib extruded sheet. The system assembly is adhesively sealed with silicone

sealant to the window assembly to provide an airtight and waterproof seal to the structure. The engineered transitions assembly maybe comprised of the following components:

- a. Silicone Rubber Sheet (SRS): Extruded, 40 durometer, ribbed translucent silicone sheet.
- b. Silicone Transition Profiles: Three dimensional injected molded profiles should be used where appropriate.
- c. Silicone Rubber Extrusion (SRE) Extruded, 40 durometer translucent silicone with lock-in dart.
- d. Metal adaptor to accept Silicone Rubber Extrusion.
- e. Silicone Sealants: Comply with ASTM C920, single-component, neutral-curing silicone; Class 100/50, Grade NS, Use O.

- F. Cleaning Agent and Cloth: As recommended by sealant manufacturer.

2.7 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Physical and thermal isolation of glazing from framing members.
 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
 6. Provisions for field replacement of glazing from exterior.
 7. Provisions for safety railings mounted on interior face of mullions or between mullions at interior as indicated, in locations indicated.
 8. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
- D. Factory-Assembled Frame Units:
 1. Rigidly secure nonmovement joints.
 2. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion.
 3. Preparation includes, but is not limited to, cleaning and priming surfaces.
 4. Seal joints watertight unless otherwise indicated.
 5. Install glazing to comply with requirements in Division 08 Section "Glazing."
- E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

- B. High-Performance Organic Finish for Interior Material: Where indicated provide Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: Match Architect's sample.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmoving joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and impediments to movement of joints.
 - 6. Seal joints watertight unless otherwise indicated.
- B. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
 - 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain walls to exterior.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- F. Install weatherseal sealant according to Division 07 Section "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.
- G. Install fiberglass insulation solid in voids between and within curtain members, behind solid panels, where curtain wall abuts adjacent construction, in shim spaces and where shown on the Drawings. Compress fiberglass to 50 percent of less of original thickness.

- H. Install spray polyurethane foam insulation solid in voids between and within curtain members, and where shown on the Drawings.
 - I. Install high performance building insulation blanket in locations indicated. Anchoring and Fastening:
 - 1. Install and anchor components in accordance with the final reviewed shop drawings.
 - 2. Anchor components with concealed fasteners and anchors. Exposed anchors and fasteners are not acceptable unless shown on the submitted shop drawings and approved by the Architect.
 - 3. Wood blocking and shims are not acceptable for attachment or anchoring curtain wall components, use only manufacturer approved shims, clip angles and attachment devices.
 - J. Extend vertical mullions to supporting structure as shown on the Drawings. Provide slotted connections anchored to the supporting structure and vertical mullion members which allows for a maximum of 1-1/2 inches of deflection of the supporting structure, unless additional deflection of the structure is indicated, or required to accommodate.
 - K. Perimeter Transition Assembly: Apply perimeter transition assembly according to manufacturer's instructions.
 - 1. Apply aluminum extrusions to perimeter of curtain wall and other penetrating elements.
 - 2. Seal and insert transition sheet and molded corners.
 - 3. Seal transition sheet and molded corners to each other and to the air barrier sheet.
 - 4. Seal edges of transition sheet and molded corners.
- 3.3 ERECTION TOLERANCES
- A. Erection Tolerances: Install to comply with the following nonaccumulating maximum tolerances:
 - 1. Plumb: 1/8 inch in 10 feet (3 mm in 3 m); 1/4 inch in 40 feet (6 mm in 12 m).
 - 2. Level: 1/8 inch in 20 feet (3 mm in 6 m); 1/4 inch in 40 feet (6 mm in 12 m).
 - 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
 - c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
 - 4. Location: Limit variation from plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/2 inch (12.7 mm) over total length.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. See Section 01 91 19 "Building Enclosure Commissioning" for building enclosure commissioning procedures and Section 01 91 19A "Building Enclosure Commissioning Appendix A" for building enclosure systems to be commissioned and for Field Testing Requirements.
 - 1. Multiple series of testing will be done at the completion levels indicated.
- C. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.

END OF SECTION

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SECTION 08 71 00 DOOR HARDWARE

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. This section includes finish hardware for Aluminum, Hollow Metal, and Wood Doors.
2. Automatic Operators

B. RELATED SECTIONS

1. Coordinate door hardware with the following sections:
 - a. 06 10 53- Miscellaneous Rough Carpentry
 - b. 07 92 00- Joint Sealants
 - c. 08 11 13- Hollow Metal Doors and Frames
 - d. 08 14 16- Flush Wood Doors
 - e. 08 41 13- Aluminum Framed Entrances and Storefronts
 - f. 08 42 43- Intensive Care Unit/ Critical Care Unit Entrances
 - g. 09 91 23- Interior Painting
 - h. 26 05 19- Low Voltage Electrical
 - i. 28 10 00- Security System

1.2 REFERENCES

A. Use the following publication for proper application of the finish hardware:

1. Builders Hardware Manufacturers Association (BHMA)/American National Standards Institute (ANSI) A156.1 Butts and Hinges (2006)
2. BHMA/ANSI A156.3 Exit Devices (2008)
3. BHMA/ANSI A156.13 Locks and Latches (2005)
4. BHMA/ANSI A156.18 Materials and Finishes (2006)
5. BHMA/ANSI A156.19 Standard for Power Assist and Low Energy Power Operated Doors (2002)
6. ANSI/Door Hardware Institute (DHI) A115.IG Installation Guide for Doors and Hardware (1994)
7. International Code Council (ICC)/ANSI A117.1 Standard for Accessible and Usable Building and Facilities (2009)
8. Underwriters Laboratory (UL)10C –Standard for Positive Pressure Doors and Other Opening Protectives (2012)
9. UL1784 –Standard for Air leakage Test for Door Assemblies (2009)
10. National Fire Protection Agency (NFPA) 80- Standard for Fire Doors and Other Opening Protectives
11. DHI publication Sequence and Format of the Hardware Schedule (2017)
12. DHI publication Keying Systems and Nomenclature (1999)

1.3 SUBMITTALS

A. GENERAL REQUIREMENTS

1. Submit hard copies of the following schedules and shop drawings to the Architect. Label the schedules and shop drawing pages with the submission

date, Project name, Location, Architect's project number, and corresponding specification section:

- a. Draft hardware schedule in vertical format as described in DHI publication Sequence and Format of the Hardware Schedule.
- b. Submit catalog cuts for all specified finished hardware.
- c. Submit key schedule based the Keying meeting direction and in accordance with DHI publication Keying Systems and Nomenclature.
- d. Furnish elevations drawings with individual operational descriptions. Identify the electrical hardware mounting locations, enclosures sizes, and quantity of conductors. Identify the electrical components with a legend.
- e. Templates: Furnish two sets of manufacturers' templating information for mortised and templated hardware upon receipt of the approved hardware schedule, to the door and frame suppliers upon request. Include requirements for internal reinforcements required for surface mounted hardware.
- f. Samples: Submit samples as requested by the Architect of any materials Specified herein. Samples shall be clearly marked with the manufacturer's name and number and with the schedule number. Samples shall be returned to the supplier after being reviewed.

1.4 QUALITY ASSURANCE

- A. Provide hardware from a recognized supplier who employs an Architectural Hardware Consultant (AHC) and is enrolled in the DHI Continuing Education Program.
- B. Hardware shall be installed by individuals who have installed commercial door hardware for a minimum of five years and are familiar with the products used on this Project.
- C. Prior to hardware installation, meet with hardware installer and hardware supplier.
 1. Review the door, frame, and hardware requirements.
 2. Provide installer with a copy of the approved finish hardware schedule.
 3. Review the manufacturer's installation instructions for each hardware item.
- D. Provide hardware for fire rated door assemblies that comply with the following:
 1. NFPA 80
 2. The door, frame, and hardware manufacturers' listings
 3. Provide fire exit hardware on individual doors bearing the label stating "Fire Door to be Equipped with Fire Exit Hardware."
 4. Provide fire exit hardware, latch bolt assemblies, and closing devices bearing labels or marks from testing agencies that affirm the products' compliance with fire rated door assembly requirements.

1.5 SHIPPING, HANDLING, AND DELIVERY

- A. Mark all locksets, exit devices, cylinders, auxiliary hardware and key switches with keyset symbol.
- B. Comply with the following delivery and storing requirements:
 1. Deliver hardware to jobsite, in one shipment, in manufacturer's original packaging marked to correspond with approved hardware schedule with the Architect's door numbers and hardware set numbers.
 2. Upon delivery to jobsite, jointly check in hardware against approved hardware schedule with hardware supplier.

3. Make a record of damages, shortages and hardware that shipped to a door and frame manufacturer for factory fitting and installation. Replace damaged hardware.
4. Replace wet or damaged packaging with new packaging.
5. Store hardware in a secure room and on shelving.
6. Store exit devices, door operators, thresholds and gasketing on wooden pallets.
7. Take the measures to prevent damage and loss of hardware.

1.6 KEYING MEETING

- A. After receipt of an approved Hardware Schedule, and prior to ordering any locking devices, hardware supplier shall arrange through the Contractor for a meeting with the Architect and Owner to discuss keying requirements. A Keying Layout Schedule shall be submitted for review within ten days after such meeting.
- B. Great Grand Masterkey, Grand Masterkey and Master Key all locks and cylinders to the existing Medeco Keymark interchangeable core system as directed by the Owner.
- C. Installation of permanent cores shall be the responsibility of the Contractor as directed by Owner.

1.7 SPECIAL REQUIREMENTS

- A. All lever trim for door locks to hazardous areas such as Mechanical Rooms, Electrical Rooms, etc., shall have a tactile surface to comply with requirements of the Authority Having Jurisdiction.
- B. Tools for Maintenance: All special tools packed with hardware items shall be saved and turned over to the Owner upon completion of the work.
- C. Lock fronts, flush bolt faces, and strikes shall be beveled in accordance with manufacturers' standards.
- D. Handing shall be verified by this supplier.
- E. All electrified hardware items are to be interfaced with the Fire Alarm and Security System. Voltages to be coordinated.
- F. Refer to Hollow Metal, Wood and Aluminum Door Sections regarding adequate blocking and reinforcing for surface-applied hardware.
- G. Hardware not specifically listed for a particular opening shall be the same as hardware scheduled for similar openings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers are approved for the Project. Furnish all like items from one manufacturer.

Butt Hinges	Bommer, Hager, Stanley
Pivots	Architectural Builders Hardware Mfg. Inc. (ABH)
Rescue Hardware	ABH
Electric Power Transfers	Von Duprin
Cylinders/Keying	Medeco Keymark
Locksets/Latchsets	Schlage
Push Pull Latches	ABH

Exit Devices	Von Duprin
Door Closers	LCN
Automatic Operators	LCN
Door Pulls	Burns, Hager, Rockwood
Protection Plates	Burns, Hager, Rockwood
Floor & Wall Stops	Burns, Hager, Rockwood
Overhead Stops/holders	ABH
Thresholds	Hager, National Guard Products, Inc. (NGP), Pemko
Door Bottoms	National Guard, Pemko, Hager
Astragals	National Guard, Pemko, Hager
Gasketing	National Guard, Pemko, Hager
Key Cabinet	Lund

2.2 SUBSTITUTIONS

- A. Alternate products may be furnished if approved by the Architect prior to bid date.

2.3 MATERIALS

A. SCREWS AND FASTENERS:

- 1. Provide manufacturer's recommended fasteners for each application, door and frame material. Furnish fastener that comply with the door and frame manufacturers' UL10C listings for the specified rating. Surface mounted hardware shall be attached without the use of sexnuts and bolts or through bolts and grommet nuts with exception of offset pulls, surface overhead stops and magnetic locks. Provide threaded-to-head wood screws for mortised hinges on wood doors. Provide sheet metal screws for screw-on weatherstrip and protection plates. Provide stainless steel machine screws with lead anchors for thresholds. Provide machine screws with metal expansion shields where hardware is installed on concrete, masonry, or tile. Match exposed fasteners to hardware finish

B. HINGES

- 1. Provide five knuckle, ball bearing, flat-button tip, stainless steel, square corner, hinges where listed in the hardware sets. Furnish hinges that comply with ANSI A156.1. Hinge of hinges are to be 4 1/2 inches for door up to 36 inches wide; 5 inch hinge height for door over 36 inches wide. Provide 1 pair of hinges for doors up to 60 inches in height and provide one additional hinge for every 30 height inches or fraction thereof. Size the width of hinges to minimally clear trim. Provide swing clear hinges as required to achieve clear width requirements. Provide reverse bevel locking doors with non-removable pins (NRP). Provide hinges from one of the below manufacturers.

	Hinge	Bommer	Hager	Stanley
a.	Standard Weight	BB5002	BB1191	FBB191
b.	Heavy Weight	BB5006	BB1199	FBB199
c.	Swing Clear Heavy Weight	BB5026	BB1363	STSFB278

C. RESCUE HARDWARE SETS

- 1. Provide non-handed, center-hung, double acting, top and bottom pivot set in accordance with the manufacturer's recommendations for application, weight, size, and door thickness. Provide handed, double lip strike and emergency stop release combination according to the frames jamb depth. Strike to have

special latch cutout for mortise lockset application. Provide rescue hardware manufactured by ABH:

- a. Pivot Set- 0128
- b. Combination Double lip strike rescue door stop – SCRM4500 Series x 1/8" Inset

D. LOCKS AND LATCHES

1. MORTISE LOCKS

- a. Furnish ANSI/BHMA certified locksets that comply with ANSI A156.13 Series 1000, Operational Grade 1. Provide locksets handed at the factory, for the specified door thickness, centered in door, with 2 3/4 inch backset, 3/4 inch latch throw, sectional trim, and UL 10C listed for the specified ratings.
 - 1) Provide Schlage L9000 Series with 06A Lever and Rose

2. HOSPITAL LOCKS AND LATCHES

- a. Provide hospital latches handed at the factory, for the specified door thickness, centered in door, with 2 3/4 inch backset, 3/4 inch latch throw, UL10C listed for the specified ratings and engraved handles reading "Push" and "Pull". Mount the paddles horizontally.
 - 1) Provide ABH 6600 Series

3. CYLINDRICAL LOCKS

- a. Furnish ANSI/BHMA certified locksets that comply with ANSI A156.2 Series 4000, Operational Grade 1. Provide non-handed locksets, for the specified door thickness, centered in door, with 2 3/4 inch backset, 1/2 inch latch throw, and UL 10C listed for the specified ratings.
 - 1) Provide Schlage ND Series with Rhodes lever design.

4. STRIKES

- a. Provide strikes as recommended by the lock and frame manufacturers for the specified application. Size the lip-to-center (LTC) of strike dimension to minimally clear trim. Omit strike plate where a monitor strike, electric strike, or rescue/double lip strike is specified separately. Provide wrought strike boxes.

E. EXIT DEVICES

1. Furnish exit devices certified to ANSI A156.3, Grade 1. Provide handed, heavy duty push pad type exit devices that are sized to accommodate the specified door thickness, opening width, and height. Include latches with 3/4 inch throw. Where outside operation is specified, furnish exit devices with escutcheon trim with levers that match locksets lever design. Provide listed panic hardware with cylinder dogging (CD) where specified for non-rated doors. Where exit devices are specified for fire rated doors, provide labelled fire exit hardware (F) that is both panic listed and UL 10C listed for the specified fire ratings. Furnish quiet electric latch retraction where QEL is indicated. Where delayed egress (CX) is indicated furnish with compliant signage, local alarm, and controlled delay duration for the time specified followed by unrestricted egress. Include fire alarm contacts for delayed egress devices that will remove power from the devices and allow immediate egress. Provide exit devices with fail secure (FSE) or fail safe (FS) outside operation where specified. Furnish latchbolt monitor (LX) and push pad monitor (RX) where indicated. Power electrified exit devices with 24 volts direct current

(VDC). Where exit devices are specified for 90Min rated, double egress openings, furnish exit only, surface vertical less bottom rod (LBR) fire exit hardware including an auxiliary fire pin kit (AFL). Furnish shim kits for mounting exit device over raised moldings. Furnish strikes as recommended by the manufacturer for the specified application and that comply with their UL listings. Furnish the device less strike where an electric strike is specified for the same door.

- a. Provide Von Duprin 98 Series Devices.

F. CYLINDERS

1. Provide locksets with the manufacturer's standard 7-Pin interchangeable core cylinder housing, with keyed construction cores. Provide exit devices with cylinders by the same manufacturer as the locksets. Include collars, tailpieces, cams, and lengths as recommended by the lock and exit device manufacturers for the specified application.

G. SURFACE DOOR CLOSERS

1. Provide heavy duty surface door closers where indicated in the hardware sets. Manual door closers shall be certified to exceed ten million (10,000,000) cycles by an independent testing laboratory. Provide listed surface closers with separate and independent valves for closing speed, latch speed and backcheck. Provide heavy duty parallel rigid arms for outswinging, push-side mounting. Size door closes based on manufacturer's recommendation. Furnish closers with that comply with opening forces described in ICC/ANSI 117.1 for manual doors. Provide with brackets, spacers, and mounting plates required for the attaching closer to the specified door and frame. Include special templates to accommodate other hardware specified for opening.
 - a. Provide LCN 4040 XP Series

H. AUTOMATIC LOW ENERGY OPERATORS

1. Provide handed, LCN 9500 Series low energy operators complying with ANSI/BHMA A156.19 where indicated in the hardware sets. Provide the appropriate arms, brackets, and plates for the specified applications. Furnish a set of operators for pair doors. Where operators are indicated in the hardware sets, provide simultaneous configured operators for service and staff areas and independent configured operators for public areas.
 - a. Provide LCN Model# 8310-813 hardwired touchless actuators for low energy operators.

I. STOPS AND STAYS

1. Wall Stops shall be provided at openings to prevent doors or hardware from contacting a wall. Wall Stops shall be Rockwood 405.
2. Furnish ABH 1000SL where concealed overhead stops are indicated in the hardware sets. Furnish less spring (LS) when used with a door receiving an automatic operator or electronic closer. Provide with special templating or layouts for swing clear applications.
4. Where wall stops cannot be used, furnish an Overhead Stop equal to ABH 9020A Series.

J. PROTECTION PLATES

1. Kick Plates shall be Rockwood K1062, 8-in. high, except as noted. Width of plate shall be determined by the width of the door: plates shall be 2" less than door width (LDW) on single doors, and 1" LDW on pairs of doors.

2. Mop Plates shall be Rockwood K1062, 4-in. high, except at double egress openings; match armor plate and kick plate height where specified in double egress openings. Width of plate shall be determined by the width of the door: plates shall be 1" LDW.
3. Armor Plates shall be Rockwood K1062, 34" high. Plates shall be 2" LDW on single doors, and 1" LDW on pairs of doors. Furnish with UL label at fire rated doors.
4. Adjust sizes further to accommodate other hardware specified on the same including continuous hinges, astragals, and edging.
5. Furnish protection plates beveled on all four sides.

K. THRESHOLDS, AUTOMATIC DOOR BOTTOMS

1. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound and light) as specified and per architectural details. Match finish of other items as closely as possible. Size of thresholds shall be as follows:
 - a. Exterior Saddle Thresholds – ½ inch high x jamb width x door width
 - b. Interior Saddle Thresholds – 1/4 inch high x jamb width x door width
 - c. Bumper Seal Thresholds – ½ inch high and 5 inches wide x door width
2. Provide door sweeps, seal, astragals, and auto door bottom only of type where resilient or flexible strip is easily replaceable and readily available.
3. Acceptable manufacturers and/or products: Hager, National Guard, Pemko

L. MISCELLANEOUS

4. Silencers shall be furnished for all interior hollow metal/wood frames, three for each single door and two for each pair of doors. Silencers shall be Burns 500/501.
5. Horn/Strobe shall be Schlage Electronics L1910S
6. Furnish Detex MS-2049F where door position switches are indicated in the hardware sets.
7. Provide Schlage Electronics/Von Duprin PS900 power supplies for electrified hardware. Furnish amperage that will accommodate 50 percent more than the sum of loads in the hardware set. Furnish with relays and power distribution boards as recommended by the manufacturer for the specified application. Furnish with fire alarm interface contacts for exit devices equipped with one or a combination of the following features: delayed egress, electric/motorized latch retraction devices, and fail safe trims. Furnish power supplies with battery back-up kits that include a pair of the manufacturer's standard batteries.
8. Provide Von Duprin model# EPT where electric power transfers are indicated in the hardware sets. Furnish with the appropriate number of conductors for the specified application.
9. Furnish Schlage Electronics 650 Series where key switches are specified. Include a cylinder as recommended by the manufacturer.

2.4 FINISHES

- A. Furnish hardware with finishes that comply with ANSI A156.18 as follows:
- | | |
|---|--|
| 628 Satin Aluminum Clear Coated | Power Transfers, Door Operators |
| 626 Satin Chromium/Brass or Bronze Base | Pivots, Wall Stops, Double Lip Strikes |

630 Satin Stainless Steel	Hinges, Locksets, Exit Devices, Hospital Latches, Overhead Stops, Protection Plates
689 Painted Aluminum	Surface Closers
719 Mill Finish Aluminum	Thresholds, Weatherstripping
Black Silicone	Gasketing
White Silicone	Gasketing at clean rooms
Grey Rubber	Silencers

2.6 KEYING

- A. Provide locksets and cylinders with temporary keyed construction cores that match profile, style, and pinned chambers of the permanent core for use during construction.
- B. Provide permanent cores for locksets and cylinders keyed to the existing key system. Provide for future 10 percent expansion of the system. Stamp permanent keys "Do Not Duplicate" and with the corresponding keyset symbol as listed on the approved keying schedule. Stamp cores on the side with the corresponding keyset.
 1. Furnish the following quantities of keys:

a. Four	Grand Masterkeys
b. Twelve	Masterkeys each set
c. Three	Change Keys each lock or cylinder.
d. Four	Construction Masterkeys.
e. Two	Construction Control Keys
f. Two	Permanent Control Keys

2.7 KEY CONTROL

- A. Provide Lund 1204 wall mounted key cabinet with two tag filing system. Include one copy of the bitting list inside the cabinet. Furnish cabinet with 250 key capacity.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to installing hardware verify the following is complete and correct:
- B. Ensure frames are installed plumb, square, level, true and free from defects.
- C. Ensure all doors and frames are the correct size, hand, and rating.
- D. Verify the doors, frames, and walls are adequately reinforced and blocked for the specified hardware.
- E. Masonry wall wash down is complete.
- F. Finish flooring is complete at the opening.
- G. Painting and staining of the door and frames are complete.
- H. Wiring has been run to the opening.

3.2 INSTALLATION

- A. Use only the fasteners provided with the hardware from the manufacturer. Countersink surfaces as required where using flat and oval head fasteners.
- B. Mount hardware per ANSI/DHI A115.IG with the following exceptions:
- C. Where compliant with ICC/ANSI 117.1, locate exit devices center midrail at stile and rail doors and aluminum doors with two lites.

- D. Clearances are to comply with NFPA 80.
- E. Install door closers and automatic operators on stair side of stair doors, interior side of exterior doors, and opposite corridor-side of corridor doors.
- F. Notch thresholds to fit frame profile. Install with machine screw and lead anchors. Seal in accordance with 07 92 00.
- G. Install gasketing in compliance with NFPA 105. Ensure door latches properly and is free from binding.
- H. Install bottom of protection plates flush with the bottom of the door.
- I. Only install fire exit hardware on doors bearing a label stating "Fire Door to be equipped with Fire Exit Hardware."

3.3 FIELD QUALITY CONTROL

- A. Enlist the services of an AHC to inspect hardware to ensure it complies with the specification. Submit list of deficiencies for correction two weeks prior to substantial completion.

3.4 DEMONSTRATION

- A. Instruct the Owner on the use and adjustment of the electrified products.

3.5 ADJUSTING AND CLEANING

- A. After HVAC system has been commissioned, adjust all closers to comply of ICC/ANSI A117.1

3.6 PROTECTION

- A. Protect all fire rating labels during and prior to construction. Keep all factory applied protective film on hardware until Substantial Completion.

3.7 HARDWARE SETS

HW-1A

HW Hinges

2 Electric Power Transfers

1 Exit Device 9827EO-F x QEL x LBR AFL

1 Exit Device 9827EO-F x LX x RX x QELx LBR

1 Cylinder

1 Permanent Cores

1 Pair Low Energy Operators x DE

2 Signage "AUTOMATIC CAUTION DOOR PRESS SWITCH TO ACTIVATE"

1 Exit Device Signage "PUSH TO OPEN & ALARM WILL SOUND"

2 Actuators

2 Stops

2 Armor Plates

2 Mop Plates

1 Set Gasketing 2525

1 Power Supply PS904x 4RL x FA

1 Door Position Switch

1 Horn/Strobe

1 Junction Box

1 Key Switch

1 Card Reader SECTION 28 13 00

Alarmed Door Operation:

Door is normally closed with alarm armed.

Presentation of valid credential to outside card reader, shunts the alarm, disarms the alarm exit device, and allows secure-side actuator to be activated. At this time, activating the touchless actuator triggers the exit devices' latches to retract and then the operators' open/close cycle. Alarm exit device rearms when doors re-latch.

Secure Side-Unauthorized use: Pressing the push pad sounds the local alarm and the strobe flashes until reset.

Activating the touchless actuator on the non-secure side, shunts the alarm, triggers the latches to retract and then the operators' open/close cycle.

Free egress from either side at all times. Upon loss of power or fire alarm activation, the doors close and latch.

HW-1B

HW Hinges

- 2 Electric Power Transfers
- 1 Exit Device 9827EO-F x QEL x LBR AFL
- 1 Exit Device 9827EO-F x LX x RX x QEL x LBR
- 1 Cylinder
- 1 Permanent Cores
- 1 Pair Low Energy Operators x DE
- 2 Signage "AUTOMATIC CAUTION DOOR PRESS SWITCH TO ACTIVATE"
- 1 Exit Device Signage "PUSH TO OPEN & ALARM WILL SOUND"
- 2 Actuators
- 2 Stops
- 2 Kick Plates
- 2 Mop Plates
- 1 Set Gasketing 2525
- 1 Power Supply PS904x 4RL x FA
- 1 Door Position Switches
- 1 Horn/Strobe
- 1 Junction Box
- 1 Key Switch
- 1 Card Reader SECTION 28 13 00

Alarmed Door Operation:

Door is normally closed with alarm armed.

Presentation of valid credential to outside card reader, shunts the alarm, disarms the alarm exit device, and allows secure-side actuator to be activated. At this time, activating the touchless actuator triggers the exit devices' latches to retract and then the operators' open/close cycle. Alarm exit device rearms when doors re-latch.

Secure Side-Unauthorized use: Pressing the push pad sounds the local alarm and the strobe flashes until reset.

Activating the touchless actuator on the non-secure side, shunts the alarm, triggers the latches to retract and then the operators' open/close cycle.

Free egress from either side at all times. Upon loss of power or fire alarm activation, the doors close and latch.

HW-2

HW Hinges

- 1 Exit Device CX E9875-L-F x FS x 20 Seconds Delay x 24VDC
- 1 Signage "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 20 SECONDS."
- 2 Cylinders
- 2 Permanent Cores
- 1 Closer
- 1 Stop
- 1 Kick Plate
- 1 Set Gasketing 2525
- 1 Electric Power Transfer
- 1 Power Supply PS904 x FA x BBK
- 1 Door Position Switch
- 1 Horn
- 1 Card Reader SECTION 28 13 00
- 1 Junction Box

Operation:

Door is normally closed with outside lever locked and inside exit device armed.
Presentation of valid credential to outside card reader momentarily unlocks outside lever.
Presentation of valid credential to inside card reader momentarily allows for immediate, authorized egress without alarm.
Pressing the push pad less than two seconds sounds the horn without initiating the alarm sequence.
Depressing the push pad for longer than two seconds initiates the irreversible alarm sequence, the door can be opened in twenty seconds. The device must be reset at the door by key switch in the exit device rail.

HW-3

HW Hinges

- 1 Electric Power Transfer
- 1 Exit Device E9875-L-F x FSE x RX
- 1 Cylinder
- 1 Permanent Core
- 1 Closer
- 1 Stop
- 1 Kick Plate
- 1 Mop Plate
- 1 Set Gasketing 2525
- 1 Power Supply PS902
- 1 Door Position Switch
- 1 Card Reader SECTION 28 13 00

Operation :

Door is normally closed with outside lever locked.
Presentation of valid credential to outside card reader momentarily unlocks outside lever.
Depressing the inside push pad shunts door position switch.

Free egress at all times by inside push pad. Upon loss of power the outside lever remains locked.

HW-4

Hinges
1 Storeroom Lockset L9080
1 Permanent Core
1 Closer
1 Stop
1 Kick Plate
1 Mop Plate
1 Set Gasketing 2525

HW-4A

Hinges
1 Storeroom Lockset L9080
1 Permanent Core
1 Closer
1 Stop
1 Armor Plate
1 Mop Plate
1 Set Gasketing 2525

HW-5

Hinges
1 Exit Device 9875L-NL
1 Cylinder
1 Permanent Core
1 Closer
1 Stop
1 Kick Plate
1 Mop Plate
1 Set Gasketing 2525

HW-5A

Hinges
1 Electric Exit Device QEL 9875L-NL
1 Power Supply
1 Electric Power Transfer
1 Cylinder
1 Permanent Core
1 Closer
1 Stop
1 Kick Plate
1 Mop Plate
1 Set Gasketing 2525

HW-6

Hinges
2 Electric Power Transfers
2 Exit Devices 9827L-BEx QEL x LBR
1 Pair Low Energy Operators

4 Signage "AUTOMATIC CAUTION DOOR PRESS SWITCH TO ACTIVATE"
2 Actuators
2 Concealed Overhead Stops
2 Armor Plates
1 Power Supply PS904 x 4RL
2 Door Position Switches
1 Junction Box
1 Set Astragals A605A x 2 pcs
1 Set Weatherstripping 706A
2 Sweeps C627A
1 Threshold 425E
1 Card Reader SECTION 28 13 00

Operation:

Doors are normally closed and latched.

Activating the touchless actuator triggers the exit devices' latches to retract and then the operators' open/close cycle.

Free egress from either side at all times. Upon loss of power, the doors close and latch.

HW-7

Hinges

1 Electric Power Transfer
1 Storeroom Lockset L9080 x RX
1 Permanent Core
1 Closer
1 Concealed Overhead Stop
1 Kick Plate
1 Door Position Switch
1 Set Weatherstripping 706A
1 Sweep C627A
1 Threshold 425E

Operation:

Door is normally closed with outside lever locked.

Presentation of valid credential momentarily unlocks outside lever.

Free egress by inside lever at all times. Turning inside lever shunts door position switch, signaling authorized use.

HW-8

Hardware as specified in Section 08 42 43

HW-9

Swing Clear Heavy Height Hinges

1 Hospital Privacy Set ND44S RHO
1 Concealed Overhead Stop x Special Layout
1 Kick Plate
1 Mop Plate
1 Set Gasketing 2525

HW-10

Hinges

1 Fail Secure Lockset L9092 EU x RX

- 1 Permanent Core
- 1 Closer
- 1 Stop
- 1 Kick Plate
- 1 Mop Plate
- 1 Set Gasketing 2525
- 1 Power Supply
- 1 Electric Power Transfer
- 1 Door Position Switch
- 1 Card Reader SECTION 28 13 00

Operation:
Door is normally closed with outside lever locked.
Presentation of valid credential momentarily unlocks outside lever.
Free egress by inside lever at all times. Turning inside lever shunts door position switch, signaling authorized use.

HW-11

- Hinges
- 1 Fail Secure Lockset L9092 EU x RX
 - 1 Cylinder
 - 1 Permanent Core
 - 1 Closer
 - 1 Stop
 - 1 Armor Plate
 - 1 Mop Plate
 - 1 Set Gasketing 2525
 - 1 Power Supply
 - 1 Electric Power Transfer
 - 1 Door Position Switch
 - 1 Card Reader SECTION 28 13 00

Operation:
Door is normally closed with outside lever locked.
Presentation of valid credential momentarily unlocks outside lever.
Free egress by inside lever at all times. Turning inside lever shunts door position switch, signaling authorized use.

HW-11A

- Hinges
- 1 Fail Secure Lockset L9092 EU x RX
 - 1 Cylinder
 - 1 Permanent Core
 - 1 Closer
 - 1 Stop
 - 1 Set Gasketing 2525
 - 1 Power Supply
 - 1 Electric Power Transfer
 - 1 Door Position Switch

1 Card Reader SECTION 28 13 00

Operation:

Door is normally closed with outside lever locked.

Presentation of valid credential momentarily unlocks outside lever.

Free egress by inside lever at all times. Turning inside lever shunts door position switch, signaling authorized use.

HW-12

- 1 Center-hung Pivot Set
- 1 Privacy Set L9040 x Outside Occupancy Indicator
- 1 Combination Double lip strike rescue door stop
- 1 Concealed Overhead Stop
- 2 Kickplates
- 1 Pivot Edge Mortise Astragal 136N
- 1 Hinge Edge Mortise Astragal Set 136N

HW-13

- Hinges
- 1 Office Lockset L9050
 - 1 Permanent Core
 - 1 Stop
 - 1 Set Gasketing 2525

HW-13A

- Hinges
- 1 Office Lockset L9050
 - 1 Permanent Core
 - 1 Stop
 - 1 Set Gasketing 2525
 - 1 Automatic Door Bottom 423N
 - 1 Threshold 513

HW-14

- Hinges
- 1 Classroom Lockset L9070
 - 1 Permanent Core
 - 1 Closer
 - 1 Back Plate
 - 1 Stop
 - 1 Set Seal BY FRAME MANUFACTURER
 - 1 Automatic Door Bottom BY FRAME MANUFACTURER
 - 1 Threshold 513

HW-14A

- Hinges
- 1 Classroom Lockset L9070
 - 1 Permanent Core
 - 1 Closer
 - 1 Back Plate

1 Stop
1 Set Gasketing 2525

HW-15

Hinges
1 Lockset (Storeroom)
1 Permanent Core
1 Closer
1 Stop
1 Kick Plate
1 Set Gasketing 2525
1 Sweep 200N
1 Threshold

HW-15A

Hinges
1 Lockset (Storeroom)
1 Permanent Core
1 Closer
1 Stop
1 Set Gasketing 2525
1 Armor Plate
1 Mop Plate

- END OF SECTION -

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
1. Windows.
 2. Doors.
 3. Glazed curtain walls.
 4. Glazed entrances.
 5. Interior borrowed lites.
- B. Sustainable Building Requirements:
1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 2. Section 01 45 34 "Mockups for Exterior Wall Systems" for visual mockups.
 3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 4. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 5. Section 07 21 00 "Thermal Insulation" for insulation behind spandrel glass.
 6. Section 08 44 13 "Glazed Aluminum Curtain Walls" for curtain wall framing.
 7. Section 08 81 13 "Decorative Glass Glazing" for decorative glass.
 8. Section 08 88 36 "Switchable Glass" for switchable electrochromic privacy glass.

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design:
 - 1. Glass thicknesses and heat treatment indicated are minimums listed for detailing only.
 - 2. Design glazing, including comprehensive analysis, using performance requirements, design criteria and industry standards indicated herein. Confirm glass thicknesses by analyzing Project loads and in-service conditions.
 - 3. Manufacturer's Engineering Analysis for Exterior Glazing: The glass manufacturer shall perform wind load and thermal stress analyses and select glass thickness strength (including heat treatment) required to demonstrate compliance of glass with performance requirements.
 - 4. Manufacturer's Engineering Analysis for Interior Glazing Supporting Railings: The glass manufacturer shall perform an engineering analysis of the glass and its attachments. See Section 05 52 13 "Pipe and Tube Railings" for railing attachments to glass and for loads imposed by the railings.
- C. Design glass according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
 - 1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
 - a. Wind Design Data: As indicated on Drawings.
 - b. Seismic Design Data: As indicated on Drawings.
 - 1) Importance factor = 1.25
 - 2. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 - 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/60 times the short-side length or 1 inch (25 mm), whichever is less and sloped glass (including glass canopies) not to exceed 1/2 inch (13mm) at center point. Deflection at 1.5 times design wind load shall be limited to prevent disengagement from the framing.
 - 4. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.
 - a. The thicknesses determined shall be based upon a probability of breakage not to exceed 8 lites per 1000 for vertical glazing (not over 15° from vertical) and 1 lite per 1000 for sloped glazing (15° or more from vertical).

- b. The above probabilities shall be based on a statistical analysis of destructive testing in which glass, representative of that described in the Drawings and Specifications, is exposed to uniform static loads held for one minute per 1/8 inch increment of center point deflection until destruction.
 5. Glass shall be of the appropriate thickness and strength to withstand anticipated thermal stresses based on a probability of breakage not to exceed 8 lites per 1000 for vertical glazing and 1 lite per 1000 for sloped glazing or guardrails.
 6. Glass shall in no case be considered to provide lateral or dead load support to metal framing members.
 7. No glass breakage, glass fallout, or permanent damage and no deformations greater than 0.2% of clear span at 150% of design wind pressure.
 8. Seismic:
 - a. Acceptable level of damage:
 - 1) Continued operation: The building enclosure system components remain in the same condition after the design level event as they were prior with little or no repair or replacement.
 - 2) Glass in the glazed curtain walls and storefronts will perform according to requirements by NEHRP Recommended Seismic Provisions (FEMA P-750) for immediate occupancy and life-safety performance objectives that include the following:
 - a) Glass remains unbroken in its frame and anchorage.
 - b) Glass cracks but remains in its frame or anchorage while continuing to provide a weather barrier, and to be otherwise serviceable.
 9. Heat Treatment for Exterior Lites: Provide Heat Strengthened exterior lites, unless Fully Tempered or Laminated Glass are indicated.
 10. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
 11. Tempered Glass: Tempered glass intended for use on the project, for spandrels and where indicated, shall be heat soaked tested in accordance with prEN 14179-1 "Heat Soaked Thermally Toughened Soda Lime Silicate Safety Glass" for a minimum of 2 hours at not less than 280°C. in order to minimize the occurrence of nickel sulfide crystals. This process shall be strictly controlled and carried out paying particular attention to temperature limits and duration of treatment for each phase.
 12. Glass installed adjacent to walking surfaces shall withstand the following design loads within limits and under conditions indicated:
 - a. Differential deflection of adjacent unsupported edges shall not exceed glass thickness when subjected to 50 lbf/ft. (730 N/m) applied horizontally to one panel at any point up to 42 inches (1067 mm) above the adjacent walking surface.
 13. Safety Glazing: For glass panels that are accessible to pedestrians (and not protected by an 18 in. high obstruction) provide safety glazing (either laminated or fully tempered glass)
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

1.4 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.
- B. Comply with requirements specified in Sections "Glazed Aluminum Curtain Walls", "Aluminum Framed Entrances and Storefronts", for field hose testing of glass panels installed in assemblies erected in the work of those sections.

1.5 BID SUBMITTALS

- A. The following submittals are to be made with the proposal:
1. Qualification data.
 2. Product test reports:
 - a. Structural calculations.
 - b. Acoustical Tests.
 - c. Thermal tests.
 - d. Other?

1.6 ACTION SUBMITTALS

- A. Sequential Review: This Specification Section requires review of submittals by Architect's Consultants, Owner, Owner's insurer and other parties. Allow 20 days for initial review of each submittal.
- B. Product Data: For each glass product and glazing material indicated.
- C. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Composite Wood Products.
 - 4) Ceilings, Walls, Thermal and Acoustical Insulation products.
- D. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
- E. Glazing Accessory Samples: For gaskets sealants and colored spacers, in 12-inch (300-mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- F. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.7 INFORMATIONAL SUBMITTALS

- A. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Wind Load and Thermal Stress Analyses: Copies of manufacturer's wind load and thermal stress analyses.
- B. Qualification Data: For installers manufacturers of insulating-glass units with sputter-coated, low-e coatings glass testing agency and sealant testing agency.
- C. Product Certificates: For glass and glazing products, from manufacturer.
 - 1. Provide certification from glass producer/fabricator that glass producer/fabricator has reviewed all glazing details and thicknesses and finds same suitable for the purpose intended in accordance with these specifications. This shall include a written wind load and thermal stress analysis showing a probability of failure of no greater than eight (8) lites per thousand at the design and test loads and local climatic thermal conditions.
 - 2. Certification, Tempered Glass Testing: Submit certification that tempered glass intended for use on the project has been heat soaked tested in accordance with prEN 14179-1 "Heat Soaked Thermally Toughened Soda Lime Silicate Safety Glass".
 - 3. Certification, Insulating Glass Testing: Submit certification that the insulating glass units have been granted the IGCC classification "CBA" or Associated Laboratories Inc. Classification "Level A".
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for coated glass insulating glass glazing sealants and glazing gaskets.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- E. Preconstruction adhesion and compatibility test report.
- F. Warranties: Sample of special warranties.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

- E. Source Limitations for Glass: Obtain ultraclear float glass, coated float glass, laminated glass and insulating glass from single source from single manufacturer for each glass type.
- F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. Glass Association of North America (GANA) Publications:
 - a. "Laminated Glazing Reference Manual".
 - b. "Glazing Manual."
 - c. "Sealant Manual".
 - 2. Insulating Glass Manufacturer's Alliance IGMA Publications
 - a. Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
 - 3. Consumer Product Safety Commission (CPSC): Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of CPSC 16 CFR Part 1201 for category II materials. Subject to compliance with requirements and local authorities having jurisdiction, provide safety glass with a removable certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.
- H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- I. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.
- J. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- K. Mockups: Provide glazing for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - 1. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring glass.
 - 2. See Section 01 45 34 "Mockups" for exterior mockups requiring glazing.
 - 3. See Section 06 42 16 "Flush Wood Paneling" for mockup of wood paneling and back painted glass wall facing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- L. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).

1.11 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's

written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

- D. Special Warranty, Sealant: Provide a written warranty, agreeing to repair or replace silicone sealant compounds which have failed to provide airtight and watertight joints for any reason, or which appear to have failed in adhesion, cohesion, abrasion-resistance, migration-resistance, stain-resistance, general durability or other form of apparent deterioration (excluding inherent qualities and limitations clearly specified in the manufacturer's data which was submitted).

1. Period of warranty shall be 20 years, and warranty shall be signed by the Manufacturer, the installer and the Contractor. Comply with these Specifications for repair or replacement of work.

PART 2 - PRODUCTS

2.1 GENERAL

A. LEED Performance Requirements

1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
2. Provide glass products with Cradle to Cradle certification, at minimum version 2 Basic level or version 3 Bronze level.
3. Provide glass products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

2.2 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum, selected for detailing purposes only. Confirm glass thickness and heat treatment necessary for glass unit sizes required against performance requirements for exterior glazing and in-service conditions. Provide glass lites in thicknesses and heat treatment as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

B. Strength:

1. Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article.
2. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article.
3. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

2.3 GLASS PRODUCTS

- A. Basis of Design for Glass: Subject to compliance with the requirements, provide Glass by Vetro, including C2C Certification, or a comparable product by another listed manufacturer.
- B. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated. Provide one of the following:
 - 1. Vitro, clear glass.
- C. Clear Low-Emissivity (Low E) Glass: Provide low "e" glass complying with ASTM C 1376 pyrolytically (magnetic sputter vacuum) coated low-emissivity glass, and resulting in a stable, uniform, nearly invisible coating which imparts increased thermal performance, tempered in doors and adjacent lights and heat strengthened where shown on Drawings or required by codes.
 - 1. Edge Deletions: Provide accurate and straight edge deletions of coatings at areas of insulating glass assemblies where Low "E" coatings, metallic coating or other decorative coatings are applied to surfaces scheduled to be in contact with the primary seal of insulating glass units.
 - a. Tolerance for edge deletion placement: Plus, or minus 1/32 inch.
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated in the Schedule, or comparable product by one of the listed manufacturers.
- D. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 - 2. For uncoated glass, comply with requirements for Condition A.
 - 3. For coated vision glass, comply with requirements for Condition C (other coated glass).

2.4 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.
 - 4. Minimum 0.030 inch thick clear polyvinyl butyral (PVB) interlayer, thickness as determined by the glass manufacturer to comply with the specified performance requirements, where shown on Drawings, provide interlayer by one of the following:
 - a. E. I. duPont de Nemours & Co., Inc., Butacite.
 - b. Vitro, Watchguard.
 - c. Solutia Inc., Saflex.

- B. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Laminated-Glass Types" Article.

2.5 INSULATING GLASS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Viracon.
- B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
 - 1. Sealing System: Dual edge-sealed, with manufacturer's standard primary and secondary seals which are certified for the insulating glass seal classification "CBA" by the Insulating Glass Certification Council (IGCC) or classification "Level A" by the Associated Laboratories, Inc. (ALI) Certification Program when tested in accordance with ASTM E2188, ASTM E2189, ASTM E773 and ASTM E774 (as sponsored by the Sealed Insulating Glass Manufacturer's Association).
 - 2. Spacer: Polypropylene covered or painted stainless steel in color selected by Architect.
 - 3. Desiccant: Molecular sieve or silica gel, or blend of both.
- C. Fabrication: Fabricate units at factory with sheets of glass hermetically sealed at edges with a permanent elastomeric sealant. Dehydrate entrapped air. Glass lights with bent, welded or fused corners, splices or joints shall be separated by desiccant filled aluminum spacer marked with the appropriate classification, listed manufacturer and approval marked on the spacer.
 - 1. Low E Coating Edge Deletion in Insulating Glass Units: Provide accurate and straight edge deletions of coatings at areas of insulating glass assemblies where Low "E" coatings, metallic coating or other decorative coatings are applied to surfaces scheduled to be in contact with the primary seal of insulating glass units.
- D. Glass: Comply with applicable requirements in "Glass Products" Article and in "Laminated Glass Schedule" Article as indicated by designations in "Insulating-Glass Types Schedule" Article and in Intensive Care Unit/Critical Care Unit (Icu/Ccu) Entrance Glazing Schedule Article.
- E. Comparable Insulating Glass Types: Makeups of insulating glass types which have performance equal or better in all respects to the makeups listed in the Insulating Glass Types Schedule, will be considered. Submit as Comparable Products.
 - 1. Glass is to be compatible with aluminum framing system, but need not be equal in depth to the scheduled insulating glass types.
 - 2. Curtain Wall with installed glass, is to have equal or better energy, optical, and sound transmission performance.

2.6 FIRE-PROTECTION-RATED GLAZING

- A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated,

based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.

- B. Laminated Ceramic Glazing: Laminated glass made from 2 plies of clear, ceramic flat glass; 5/16-inch (8-mm) total nominal thickness; complying with testing requirements in 16 CFR 1201 for Category II materials, and with premium polished surfaces.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Vetrotech Saint-Gobain; SGG Keralite FR-L.
- C. Fire-Protection-Rated Laminated Glass: 5/16-inch- (8-mm-) thick, fire-protection-rated laminated glass, complying with testing requirements in 16 CFR 1201 for Category II materials.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Oldcastle Glass, Inc.; Pyroguard.

2.7 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
 - 1. EPDM complying with ASTM C 864.
 - 2. Silicone complying with ASTM C 1115.
 - 3. Thermoplastic polyolefin rubber complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned EPDM silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
 - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.8 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
 - 4. Use sealants that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Structural Sealant: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically

formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.

1. Color: As selected by Architect from manufacturer's full range of colors.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Dow Corning Corporation; 1199 Silicone Glazing Sealant.
- b. GE Advanced Materials - Silicones; SCS2800 SilGlaze* II.

2. Applications: Glazing.

A. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Dow Corning Corporation; 790.
- b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.

2. Applications: Weatherseal.

B. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.9 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.10 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.
- H. Recessed Extruded Aluminum Glazing Channels: Aluminum extrusions complying with ASTM B 221, 6063-T5 alloy and temper G.S. 10A-T5, with clear anodized finish with manufacturer's standard continuous roll-in glazing gaskets retained in extrusion races, as manufactured by C.R. Laurence Company, or other as approved by Architect.
- I. Exposed Stainless Steel Glazing Channels: Roll formed stainless steel complying with ASTM A 666, Type 304, with manufacturer's standard continuous roll-in glazing gaskets retained in extrusion races, as manufactured by C.R. Laurence Company, or other as approved by Architect.

2.11 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Where glass is indicated to be butt joined with sealant, clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce satin finished, flat, square edges with slight chamfers at junctions of edges and faces.
- C. Where edges of glass is indicated to be exposed in the finish work, Grind smooth and polish exposed glass edges and corners and slightly ease arrises and corners.
- D. Fabricate glass for attachment of handrail brackets by providing holes of size and locations required.

2.12 MONOLITHIC-GLASS TYPES SCHEDULE

- A. Glass Type **GL1**: Clear float glass.
 - 1. Thickness: 1/4 inch (6.0mm) minimum.
- B. Glass Type **GL1T**: Clear float glass fully tempered float glass.
 - 1. Thickness: 1/4 inch (6.0mm) minimum.

2. Provide safety glazing labeling.

- C. Glass Type **GL2T**: Clear float glass fully tempered float glass.
 1. Thickness: 3/8 inch (10.0mm) minimum.
 2. Provide safety glazing labeling.

2.13 DECORATIVE GLASS TYPES SCHEDULE

- A. Decorative Glass Type **GL3**: Ultra-Clear magnetic back painted marker glass, See Section 08 81 13 "Decorative Glass Glazing."
- B. Decorative Glass Type **GL4LT**: Ultra-clear laminated glass interlayer, See Section 08 81 13 "Decorative Glass Glazing."
- C. Decorative Glass Type **GL5**: Ultra-clear laminated cast glass, See Section 08 81 13 "Decorative Glass Glazing."
- D. Decorative Glass Type **GL6**: Ultra-clear back painted glass, See Section 08 81 13 "Decorative Glass Glazing."

2.14 LAMINATED GLASS TYPES SCHEDULE

- A. Glass Type **GL1L**: Clear laminated float glass.
 1. Overall Thickness: 9/16-inches (14 mm).
 2. Thickness of each lite: 1/4-inch (6mm).
 3. Interlayer thickness: 0.060 Inches (1.5mm).
 4. Provide safety glazing labeling.
- B. Glass Type **GL6LT**: Clear laminated tempered float glass.
 1. Overall Thickness: 9/16-inches (14 mm).
 2. Inner and outer lites:
 - a. Thickness of each lite: 1/4-inch (6mm).
 - b. Fully tempered.
 3. Interlayer thickness: 0.060 Inches (1.5mm).
 4. Provide safety glazing labeling.

2.15 INSULATING-GLASS TYPES SCHEDULE

- A. Glass Type **GL-10**: Low-E-coated, clear insulating glass.
 1. Overall unit thickness: 1 3/4 inches (44.72mm)
 2. Outdoor Lite: Heat-strengthened float glass.
 - a. 5/16 inch (8mm) thickness,
 - b. Low E coating: Surface #2.
 - 1) Viracon; VE1-2M,
 3. Spacer: 1 inch (25.2mm)
 - a. Stainless steel.
 4. Fill: Argon,
 5. Indoor Lite: Laminated glass.
 - a. 3/16 inch (5mm) thickness float glass.
 - b. 0.060" (1.52mm) Clear PVB interlayer.
 - c. 3/16 inch (5mm) thickness float glass
 6. Performance:
 - a. VLT 69%

- b. Winter u-value 0.26
 - c. Summer u-value 0.17
 - d. SHGC 0.38
- B. Glass Type **GL-10A**: Low-E-coated, clear insulating glass (for Alternate).
- 1. Overall unit thickness: 2 7/8 inches
 - 2. Outdoor Lite: Heat-strengthened float glass.
 - a. 5/16 inch (8mm) thickness,
 - b. Low E coating: Surface #2.
 - 1) Viracon; VE1-85,
 - 3. Spacer: 3/4 inch (19mm).
 - 4. Fill: Argon.
 - 5. Interior Lite: Heat-strengthened float glass.
 - a. 1/4 inch (6mm) thickness.
 - b. Low E coating: Surface #2.
 - 1) Viracon; VE1-85,
 - 6. Spacer: 3/4 inch (19mm).
 - 7. Fill: Argon.
 - 8. Indoor Lite: Laminated float glass.
 - a. 5/16 inch (5mm) thickness float glass.
 - b. 0.060" (1.52mm) Clear PVB interlayer.
 - c. 5/16 inch (5mm) thickness float glass
 - 9. Spacers: Stainless steel.
 - 10. Performance:
 - a. VLT 56%
 - b. Winter u-value 0.13
 - c. Summer u-value 0.10
 - d. SHGC 0.33

2.16 FIRE-PROTECTION-RATED GLAZING TYPES SCHEDULE

- A. Glass Type **GL-20**: 20-minute fire-rated glazing; Fire-Protection-Rated Laminated Glass.
- 1. Provide safety glazing labeling.
 - 2. Provide fire protected glazing labeling.
 - 3. Fire rating: 20 minutes.
- B. Glass Type **GL-21**: 45-minute, 60-minute, 90-minute fire-rated glazing; laminated ceramic glazing.
- 1. Provide safety glazing labeling.
 - 2. Provide fire protected glazing labeling.
 - 3. Fire rating: Match opening requirements.

2.17 INTENSIVE CARE UNIT/CRITICAL CARE UNIT (ICU/CCU) ENTRANCE GLAZING SCHEDULE

- A. Base bid laminated glazing Type **GL 30**: Clear laminated float glass.
- 1. Overall thickness: 7/16 (11.52mm)
 - 2. 3/16 inch (5mm) thickness float glass.
 - 3. 0.060" (1.52mm) Clear PVB interlayer.
 - 4. 3/16 inch (5mm) thickness float glass
 - 5. Provide safety glazing labeling.

- B. Alternate glazing with integral blinds Type **GL31**: Clear fully tempered insulating float glass with integral blinds.
 - 1. Overall thickness: 1 1/4-inch maximum.
 - 2. Outside lite: 1/4 inch (6mm) fully tempered float glass.
 - 3. Spacer: coordinate with blinds.
 - 4. Integral Blinds: Manufacturer's standard.
 - a. Operation: Tilt by thumb wheel, on interior.
 - b. Color: As selected by the Architect from Manufacturer's standards.
 - 5. Interior light: 1/4 inch (6mm) fully tempered float glass.
 - 6. Provide safety glazing labeling.

- C. Alternate switchable electrochromic privacy glass Type **GL-32**: Clear laminated switchable electrochromic privacy glass.
 - 1. See Section 08 88 36 "Switchable Glass."

- D. Alternate tempered glazing with decorative film glass Type **GL-33**: Clear tempered float glass with decorative window film.
 - 1. Thickness: 1/4 inch (6.0mm) minimum fully tempered float glass.
 - 2. Provide safety glazing labeling.
 - 3. Decorative window film, Apply to interior (Room Side) surface. See Section 08 81 13 "Decorative Glass Glazing."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
 - C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
 - D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
 - E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
 - F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
 - G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
 - H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
 - I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
 - J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
 - K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
 - L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- 3.4 TAPE GLAZING
- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.
- D. At glazing without vertical frames, seal glazing units to each other and to the perimeter with structural glazing sealant. Tool both sides smooth. Use clear sealant, unless otherwise indicated.

3.7 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

SECTION 08 81 13

DECORATIVE GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Magnetic back painted glass.
2. Laminated glass.
3. Kiln cast glass laminated with color and graphic interlayers.
4. Glass with decorative film.
5. Glass frame wall cladding system.
6. Design of decorative glass, including glass supporting handrails.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 08 80 00 "Glazing."
4. Section 08 83 00 "Mirrors" for mirror glass.
5. Section 10 11 00 "Visual Display Surfaces" for glass markerboards.

1.2 DEFINITION

- ###### A. Glass Thickness:
- Indicated by thickness designations in millimeters according to ASTM C 1036.

1.3 COORDINATION

- ###### A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For decorative glass. Show fabrication and installation details. Include the following:
 - 1. Size and location of penetrations.
 - 2. Glazing method.
 - 3. Mounting method.
 - 4. Attachments to other work.
 - 5. Full-size details of edge-finished profiles.
- C. Glass Samples: For the following products, 12 inches (300 mm) square:
 - 1. Each type of decorative glass.
 - 2. Each edge treatment on type of decorative glass.
- D. Glazing Accessory Samples: For sealants, in 12-inch (300-mm) lengths.
- E. Decorative Glazing Schedule: List decorative glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- F. Delegated-Design Submittal: For decorative glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and sealant testing agency.
- B. Product Certificates: For each type of decorative glass.
- C. Preconstruction adhesion and compatibility test report.
- D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of decorative glass to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under NGA's Certified Glass Installer Program.
- B. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass with decorative film overlay, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protect decorative glass and glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Retain packaging and sequencing numbers for decorative-glass units.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install decorative glass until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of openings and construction contiguous with decorative glass by field measurements before fabrication.

1.12 WARRANTY

- A. Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Subject to compliance with the requirements, for each Type of decorative glass, provide the manufacturer indicated in the Materials Legend, on the Drawings, or a comparable product from one of the following:
1. Skyline.
 2. McGory Glass.
 3. Forms and Surfaces/Burman Glass.
 4. Glass Art.
- B. Source Limitations for Glass: Obtain each type of decorative glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer, for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, licensed to practice in the State of Maine, as defined in Section 01 40 00 "Quality Requirements," to design decorative glass.
- C. Structural Performance: Decorative glass installed adjacent to walking surfaces shall withstand the following design loads within limits and under conditions indicated:
1. Differential deflection of adjacent unsupported edges shall not exceed glass thickness when subjected to 50 lbf/ft. (730 N/m) applied horizontally to one panel at any point up to 42 inches (1067 mm) above the adjacent walking surface.
 2. Base design on thickness at thinnest part of the glass.
 3. Handrails: Where handrails are supported by glass, include handrail design loads in glass design.

- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E. LEED Performance:
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide flat glass products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers, GANA's "Laminated Glazing Reference Manual," and "GANA's "Glazing Manual" unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with requirements indicated. Where heat-strengthened glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with requirements indicated. Where fully tempered glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Ultraclear Float Glass: ASTM C 1036, Type I, Class I, Quality-Q3, and with visible light transmission not less than 91 percent.
- B. Patterned Ultraclear Glass: ASTM C 1036, Type II, Class 1 (clear), Form 3, with visible light transmission not less than 91 percent; finish, pattern, and quality as indicated.
- C. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

2.5 GLAZING MATERIALS

- A. Glazing Sealants, Tapes, and Miscellaneous Glazing Materials: As specified in Section 08 80 00 "Glazing."
1. Colors: As selected by Architect from manufacturer's full range.

2.6 GLAZING FILM

- A. Glazing Film : 3M Fesara films, As selected by architect from full range of Manufacturer's products.

2.7 HARDWARE FOR GLASS INSTALLATION

- A. Hardware: Continuous top track, Continuous floor track.
1. Extruded Aluminum Glazing Channels: Aluminum extrusions complying with ASTM B 221, 6063-T5 alloy and temper G.S. 10A-T5, with clear anodized finish with manufacturer's standard continuous roll-in glazing gaskets retained in extrusion races, as manufactured by C.R. Laurence Company, or other as approved by Architect.
 2. Material and Finish: Clear anodized aluminum.
 3. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
 4. Gaskets: Manufacturer's standard, compatible with decorative glass type indicated.
 5. Anchors and Inserts: Provide devices as required for hardware installation. Provide metal expansion-bolt devices for drilled-in-place anchors.
- B. Glass Frame Wall Cladding System:
1. Manufacturer: Forms+Surfaces.
 2. Product: LEVELe® Wall Cladding System
 3. Panel subsystem:
 - a. Vertical elements:
 - 1) Hat channel extrusion
 - 2) Outside corner extrusion
 - 3) End stop extrusion
 - 4) Hat channel covers (reveals)
 - b. Horizontal elements:
 - 1) Base cleat extrusion
 - 2) Wall reveal cleat extrusion
 - 3) Top cleat extrusion
 - c. System thickness: 1.83 inches.
 4. Corners:
 - a. Outside Corner conditions:
 - 1) Capture Panels: extruded Aluminum corner detail, anodized Aluminum to match framing details.
 - b. Inside Corner details:
 - 1) 90° angled corner extrusions are supplied for interior corners. Reveals are Black anodized Aluminum
 5. Inset material:
 - a. BermanGlass Levels artisanal kiln cast glass; Decorative Glass Type [GL-5]: Ultra-clear laminated cast glass.
 - b. Structural Backer: Manufacturer's standard.

- 6. Metal finish:
 - a. Clear anodized aluminum.

2.8 DECORATIVE-GLASS FABRICATION

- A. Fabricate decorative glass and provide other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with product manufacturer's written instructions and with referenced glazing standard.
- B. Edge Finishing: Finish edges smooth and polished, without chips, scratches, or warps.
 - 1. Finished Edge: Flat polished.
 - 2. Edge-Finished Glass Adhesive: Clear, nonyellowing, as recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine decorative-glass framing members, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Minimum required face or edge clearances.
 - 3. Effective sealing between joints of decorative-glass framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate orientation of outer surfaces. Label or mark units as needed so that surface orientation is readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 INSTALLATION

- A. Set decorative-glass units in each series true in line with uniform orientation, pattern, draw, bow, and similar characteristics.
- B. Set glass lites with proper orientation so that each outer surface faces the direction indicated on Drawings.
- C. Set decorative glass in locations indicated on Drawings. Install glass with hardware and accessories according to hardware manufacturer's written instructions. Attach hardware securely to mounting surfaces and building structure.

3.4 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, gaskets, sealants, tapes, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is more than **50 inches (1270 mm)**.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances, and to comply with system performance requirements.
 - 2. Provide **1/8-inch- (3-mm-)** minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.5 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels and between glass-to-glass joints to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants smooth.

3.6 WALL CLADDING SYSTEM

- A. Install wall cladding system according to Manufacturer's instructions.
 - 1. Vertical hat channel extrusions are attached with self-tapping screws, shimming as required to establish a planar basis for the wall cladding system.
 - 2. Corner extrusions are set next and leveled to the plane just created.
 - 3. Horizontal base cleat and reveal, followed by the wall reveal cleats, and top cleat are installed next, working up the wall.
 - 4. Vertical reveals are then attached in the corners and affixed to the hat channels.
 - 5. Lastly, the panels are engaged via a French cleat system. Note: panels can be installed and replaced independently and in any order.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 DECORATIVE GLASS SCHEDULE

- A. Decorative Glass Type [**GL-3**]: Ultra-clear magnetic back painted marker glass.
 - 1. Basis-of-Design Product: As indicated in the Materials Legend, on the Drawings.
 - 2. Construction: Ultraclear, fully tempered glass.
 - 3. Thickness: 1/4 inch.
 - 4. Back paint color: As indicated, or as selected by the Architect.
 - 5. Magnetic: Manufacturers; standard sheet or coating.
 - 6. Safety glazing required.
- B. Decorative Glass Type [**GL-4LT**]: Ultra-clear laminated glass with decorative film.
 - 1. Basis-of-Design Product: As indicated in the Materials Legend, on the Drawings.
 - 2. Construction: Two plies of ultraclear, annealed glass.
 - 3. Interior and exterior lites:
 - a. Thickness of Each Glass Ply: 1/4 inch minimum.
 - b. Fully tempered.
 - 4. Construction: Laminate glass with PVB interlayer to comply with interlayer manufacturer's written instructions.
 - 5. Interlayer Thickness: 0.060 inches.
 - 6. Safety glazing required.
 - 7. Glazing film: Apply to surface indicated, or if not indicated, to back surface.

- C. Decorative Glass Type [**GL-5**]: Ultra-clear laminated cast glass.
1. Basis-of-Design Product: As indicated in the Materials Legend, on the Drawings.
 2. Construction: Two plies of ultraclear, annealed cast patterned glass.
 3. Thickness of Each Glass Ply: 3/16 inch minimum.
 4. Construction: Laminate glass with colored PVB interlayer to comply with interlayer manufacturer's written instructions.
 5. Interlayer Thickness: 0.067 inches.
 6. Interlayer Color and Pattern: As indicated by manufacturer's designations.
 7. Safety glazing required.
- D. Decorative Glass Type [**GL-6**]: Ultra-clear back painted glass.
1. Basis-of-Design Product: As indicated in the Materials Legend, on the Drawings.
 2. Construction: Ultraclear, fully tempered glass.
 3. Thickness: 1/4 inch.
 4. Back paint color: As indicated, or as selected by the Architect.
 5. Safety glazing required.

END OF SECTION

SECTION 08 83 00

MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
 - 1. Tempered glass mirrors qualifying as safety glazing.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 08 80 00 "Glazing" for glass with reflective coatings used for vision and spandrel lites.
 - 4. Section 10 28 00 "Toilet, Bath, and Laundry Accessories" for metal-framed mirrors.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.
- D. Samples: For each type of the following:
1. Mirrors: 12 inches (300 mm) square, including edge treatment on two adjoining edges.
 2. Mirror Clips: Full size.
 3. Mirror Trim: 12 inches (300 mm) long.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Product Certificates: For each type of mirror and mirror mastic.
 - C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.
 - D. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For mirrors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.
 - 1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions

Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.2 MANUFACTURERS

- A. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- B. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

2.3 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C 1503[; manufactured using copper-free, low-lead mirror coating process].
- B. Tempered Glass Mirrors: Mirror Glazing Quality for blemish requirements and complying with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied; clear.
 - 1. Nominal Thickness: 6.0 mm.
- C. Safety Glazing Products: For tempered mirrors, provide products that comply with 16 CFR 1201, Category II.

2.4 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
 - 1. Adhesives shall have a VOC content of 70 g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 MIRROR HARDWARE

- A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
 - 1. Bottom Trim: J-channels formed with front leg and back leg not less than **3/8 and 7/8 inch (9.5 and 22 mm)** in height, respectively, and a thickness of not less than **0.04 inch (1.0 mm)**.

2. Top Trim: J-channels formed with front leg and back leg not less than **5/8 and 1 inch (16 and 25 mm)** in height, respectively, and a thickness of not less than **0.04 inch (1.0 mm)**.
 3. Finish: Clear satin anodized.
- B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
 - C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.
- 2.6 FABRICATION
- A. Fabricate mirrors in the shop to greatest extent possible.
 - B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
 - C. Mirror Edge Treatment: Flat polished.
 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

1. GANA Publications: "Glazing Manual" and "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- B. Provide a minimum airspace of **1/8 inch (3 mm)** between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
 1. Aluminum J-Channels: Provide setting blocks **1/8 inch (3 mm)** thick by **4 inches (100 mm)** long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than **1/4 inch (6.4 mm)** wide by **3/8 inch (9.5 mm)** long at bottom channel.
 2. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of **1/8 inch (3 mm)** between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer.

END OF SECTION

SECTION 08 88 36

SWITCHABLE GLASS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Switchable Electrochromic Privacy Glass for ICU/CCU Doors.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 - 2. Section 01 45 34 "Mockups for Exterior Wall Systems" for testing and visual mockups.
 - 3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 4. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 5. Division 07 Section "Building Thermal Insulation" for insulation behind spandrel glass.
 - 6. Division 08 Section "Glazed Aluminum Curtain Walls" for curtain wall framing.
 - 7. Division 26 Electrical sections for power and control for switchable electrochromic privacy glass.

1.2 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- B. Coordinate with Electrical for power and controls for switchable electrochromic glass.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Composite Wood Products.
 - 4) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For switchable glass to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Switchable Electrochromic Privacy Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Covered by Warranty:
 - a. The substantially continued operation of the eGlass films, (LC).
 - b. The continued ability to actively switch states and provide the intended effect of eGlass. (privacy)
 - c. The lamination process against delamination
 - d. The electronic control systems provided by Innovative Glass Corporation
Warranty Period: Five years from date of Substantial Completion.
 - 2. Not covered by Warranty:
 - a. Glass breakage of any form.
 - b. Failures due to improper installation or use of non-approved glazing sealants and compounds.
 - c. Excessive overvoltage to the controllers and the film.
 - d. Failures due to improper hook-up, wiring and devices not specifically provided by or approved by Innovative Glass Corporation.
 - e. Damage caused by accident, abuse, external causes, power surges or acts of god.

1.8 DELIVERY STORAGE AND HANDLING

- A. Deliver and store glass in manufacturer's cases. Unpack from front of case. Do not slide out glass units.
- B. Do not rest glass on un-cushioned surface.
- C. Do not lift or handle electrified glass by conduit, connector, or exposed wires.
- D. Do not allow glass edges to contact frame of other surfaces during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Subject to compliance with the requirements, provide LC Privacy Glass, by Innovative Glass Corporation, or a comparable product by one of the following:
1. Polyvision.
 2. Pulp Studio.
 3. Smartglass.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazing.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- C. Switchable Electrochromic Glass: When energized, E Glass / LC Privacy Glass shall change from a frosted, translucent panel to a transparent panel. When de-energized, glass reverts to being translucent.
1. Maximum switching speeds:
 - a. Clear to obscure: less than 1 second.
 - b. Obscure to clear: less than 1 second.
 2. Operating Voltage: 110 – 120 VAC / 50 – 60 Hz
 3. Operating Current: .012 Amps (12mA per SqFt.)
 4. Power consumption: Less than 1 watt per sq ft of privacy glass.
 5. Laminating Interlayers to block out over 99% of UV Rays
 6. Interlayers must be hermetically sealed around all edges; protected from moisture, and components/electrical connectors to be concealed and isolated from user.
 7. Thickness: 7/16 inch Thick (laminated).
 8. Operating temperature range: 0 to +150 degrees F.
 9. Haze – 5- 7% depending on substrates specified
 10. Specular Light Transmittance
 - a. T (On) – 75%
 - b. T (Off) - .01%
 11. Parallel Light Transmittance:
 - a. T (On) – 70%
 - b. T (Off) – 5%
 12. Total Light Transmittance:
 - a. T (On) – 80%
 - b. T (Off) – 75%

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 1. Construction: Laminate glass with switchable electrochromic interlayer to comply with interlayer manufacturer's written instructions.
 2. Interlayer Thickness: Provide manufacturer recommended thickness based on the application and as needed to comply with requirements.
 - a. Typical thickness is: 0.035 inch (0.88mm).
 3. Interlayer Color: Clear unless otherwise indicated.

2.6 ELECTRICAL PROPERTIES

Operating Voltage	120 VAC
Operating Current	12 ma / Sq Ft
Power Consumption	1.44 W / Sq Ft
Visible Light Transmission (On)	77
Visible Light Transmission (Off)	58
Specular Light (On)	75
Specular Light (Off)	0.01
Diffused Light (On)	63%
Diffused Light (Off)	4%
SHGC	
SC	
Relative Heat Gain	
U Value	0.28
UV Blocking	99%
Max Size	55" W x 120" H
Min Thickness	5/16"
Max Thickness	1 1/2"
Response Time to Switch on	0.1 Sec
Response Time to Switch off	0.4 Sec
Temperature Limits (F)	-4° to 160°

2.7 GLAZING MATERIALS

- A. Gaskets: See Sections 08 42 43 "Intensive Care Unit/Critical Care Unit (Icu/Ccu) Entrances" and 08 80 00 "Glazing."

2.8 BUS BARS AND OPERATING VOLTAGE

- A. LC Privacy Glass panels are supplied with a bus bar location which can be customized. Generally it appears along one edge of glass panel with an 18 gage wire exiting center of bus bar edge, conduit connector, and 15 ft. long of flexible wire.
- B. Operating voltage: 110 - 120 VAC.
- C. Wiring
 1. Panels are typically shipped with a 2-conductor, 15-ft. long, 18 gauge wire, exiting via a U.L. approved nipple.
 2. U.L. Approved Nipple should be located along the short edge of the panel
 3. Wires and U.L. approved Nipple should be sleeved with a 3/8" Trade size Greenfield/Flexible Conduit in the field, and routed back to an approved electrical junction box (1900 box)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate requirements for power supply, conduit, fuses, circuit breakers, electrical boxes and enclosures, and switches with Electrical.
- B. Prior to installation, verify proper type of power source, location of conduit and boxes, and protection by ground fault circuit interrupter (GFCI).
- C. Verify framing to receive electrified glass is accurately sized, structurally sound, square, and without bow. Verify surfaces of glazing channels and recesses are clean, free of obstructions, and ready to receive glazing.
- D. Drill oversized holes in frame for electric power source. Accurately align with center line of electrified glass conduit connector.
- E. Immediately prior to glazing clean contact surfaces with solvent and wipe dry.

3.2 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged

glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

- C. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- D. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- E. Provide spacers for glass lites where length plus width is larger than **50 inches (1270 mm)**.
- F. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

3.4 TESTING

- A. Inspect installation to ensure glazing is sealed and that glass edges and electrical components will not be exposed to moisture.
- B. Test each electrified privacy glass unit. Verify performance and control switching. Correct deficiencies.

3.5 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Clean glazing in accordance with manufacturer's instructions. Clean with mild, non-abrasive, non-alkaline solution and rinse with clean water. Do not use agents and equipment that might scratch or mark surface.
- C. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior

concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

- D. Remove and replace glass that is damaged during construction period.

3.6 DEMONSTRATION

- A. Demonstrate operation and maintenance of electrified privacy glazing system to Owner's representatives.

3.7 LAMINATED GLASS SCHEDULE

- A. Switchable electrochromic privacy glass Type Type **GL-32**: Clear laminated glass with two plies of annealed float glass.
 1. Basis-of-Design Product: Innovative Glass Corporation – LC Privacy Glass.
 2. Minimum Thickness of Each Glass Ply: 5 mm.
 3. Interlayer Thickness: 0.035 inch.
 4. Safety glazing required.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Gypsum board shaft wall assemblies.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 07 84 13 "Penetration Firestopping" for penetrations of fire rated walls.
 - 4. Section 09 22 16 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.2 ACTION SUBMITTALS

- A. Coordination: Submit related product data / shop drawings, specified in another Section simultaneously for approval.
 - 1. Gypsum board product data for gypsum board to be used as part of non-structural metal framing.
 - 2. Non-structural metal framing product data for walls related to shaft wall assemblies.
- B. Product Data: Furnish a material list with technical data documenting the location and primary function, quality, and performance of each material component or system to be used in the Work, or other such primary characteristics as required by the Drawings or Specifications.
 - 1. Submit manufacturer's technical data for each shaft wall system.

- C. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- D. INFORMATIONAL SUBMITTALS
- E. Span and Deflection Design Criteria: Provide height to load deflection charts showing studs supplied conform to deflection limit scheduled and allowed per ASTM C 754.
1. Mark on chart(s) showing major partitions scheduled conformance with criteria.
 2. Submit manufacturer's certification of stud size, thickness, and spacing complying with performance requirements and selections made by architect are correct for application shown.
- F. Evaluation Reports: For shaft wall assemblies and firestop tracks, from ICC-ES.

1.3 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."
- B. STC-Rated Assemblies: For gypsum board shaft-wall assemblies indicated to have STC ratings, provide assembly materials and construction complying with requirements of assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
- C. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Section 01 31 00 "Project Management and Coordination." Review methods and procedures for installing work related to gypsum board shaft-wall assemblies including, but not limited to, the following:
 - 1. Fasteners proposed for anchoring steel framing to building structure.
 - 2. Sprayed fire-resistive materials applied to structural framing.
 - 3. Elevator equipment, including hoistway doors, elevator call buttons, and elevator floor indicators.
 - 4. Wiring devices in shaft-wall assemblies.
 - 5. Doors and other items penetrating shaft-wall assemblies.
 - 6. Items supported by shaft-wall-assembly framing.
 - 7. Mechanical work enclosed within shaft-wall assemblies.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or with gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance:
1. Provide gypsum board shaft-wall assemblies capable of withstanding the full air-pressure loads indicated for maximum heights of partitions without failing and while maintaining an airtight and smoke-tight seal. Evidence of failure includes deflections exceeding limits indicated, bending stresses causing studs to break or to distort, and end-reaction shear causing track (runners) to bend or to shear and studs to become crippled.
 2. Shaft Wall Deflection Limits per ASTM C 754:
 - a. Intermittent Air Pressure (Elevators): Withstands minimum of 10 lbf/sq.ft (48 Pa) lateral load.
 - b. Constant Air Pressure (HVAC Shafts): Withstands minimum of 5 lbf/sq.ft. (24 Pa) lateral load.
 - c. Deflection of Wall Assemblies:
 - 1) Typical Finishes: L/240.
 - 2) Tile, Plaster, Stone or Similar Finishes: L/360.
 - d. Where partition heights exceed stud manufacturer's recommended spans, and to resist deflection limits or seismic forces, provide one of the following:
 - 1) Heavier stud gage.
 - 2) Closer stud spacing.
 - 3) Deeper stud size (space permitting, as determined by Architect).
 - 4) Above-ceiling bracing, anchored to structure above.
 - e. Seismic Loads and design data are indicated on the Drawings.
- B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- C. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency.
- D. LEED Performance Requirements
1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide interior gypsum board shaft wall assembly products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 3. Provide non-structural metal framing products and suspension systems with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
 4. Provide Shaftliner board products with manufacturer's product-specific Health Product Declarations (HPDs).

- E. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 90 percent.
- F. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. Studs: Manufacturer's standard profile for repetitive members, corner and end members, and fire-resistance-rated assembly indicated.
 - 1. Depth: 2-1/2 inches (64 mm) unless otherwise indicated or required to comply with span and deflection design criteria.
 - 2. Minimum Base Metal Thickness: 0.018 inches (0.45 mm) unless otherwise indicated or required to comply with span and deflection design criteria, before application of protective coating.
- B. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches (51 mm) long and matching studs in depth.
 - 1. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
- C. Firestop Tracks: Provide firestop track at head of shaft wall on each floor level.
- D. Elevator Hoistway Entrances: Manufacturer's standard J-profile jamb strut with long-leg length of 3 inches (76 mm), matching studs in depth, and not less than 0.033 inch (0.84 mm) thick.
- E. Room-Side Finish: As indicated.
- F. Shaft-Side Finish: Gypsum shaftliner board, moisture- and mold-resistant Type X and as indicated by fire-resistance-rated assembly design designation.
- G. Insulation: Sound attenuation blankets.

2.3 PANEL PRODUCTS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. Gypsum Shaftliner Board, Moisture- and Mold-Resistant Type X: ASTM C 1396/C 1396M; manufacturer's proprietary fire-resistive liner panels with moisture- and mold-resistant core and surfaces.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; ProRoc Moisture and Mold Resistant Shaftliner.
 - b. Georgia-Pacific Gypsum LLC, Subsidiary of Georgia Pacific; Dens-Glass Ultra Shaftliner.
 - c. National Gypsum Company; Gold Bond Brand Fire-Shield Shaftliner XP.
 - d. Temple-Inland Inc.; Fire-Rated GreenGlass Mold-Resistant Liner Panel.
 - e. USG Corporation; Sheetrock Brand Mold Tough Gypsum Liner Panel.
 - 2. Thickness: 1 inch (25.4 mm).
 - 3. Long Edges: Double bevel.

4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

- C. Gypsum Board: As specified in Section 09 29 00 "Gypsum Board."

2.4 NON-LOAD-BEARING STEEL FRAMING

- A. Recycled Content of Steel: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Steel Framing Members: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 1. Protective Coating: ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized unless otherwise indicated.
- C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
 - b. Steel Network Inc. (The); VertiClip SLD or VertiTrack VTD Series.
 - c. Substitutions: Comparable product from another steel framing manufacturer listed, provided track system has been tested as part of an assembly according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Single Deep-Leg Track: Not permitted.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with manufacturer's written recommendations.
- B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 09 29 00 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written recommendations for application indicated.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
- D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
 1. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing according to ASTM E 488 conducted by a qualified testing agency.

2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing according to ASTM E 1190 conducted by a qualified testing agency.
- E. Sound Attenuation Blankets: As specified in Section 09 29 00 "Gypsum Board."
- F. Acoustical Sealant: As specified in Section 09 29 00 "Gypsum Board."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to which gypsum board shaft wall assemblies attach or abut, with Installer present, including hollow-metal frames, elevator hoistway door frames, cast-in anchors, and structural framing. Examine for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Sprayed Fire-Resistive Materials: Coordinate with gypsum board shaft wall assemblies so both elements of Work remain complete and undamaged. Patch or replace sprayed fire-resistive materials removed or damaged during installation of shaft wall assemblies to comply with requirements specified in Section 07 81 00 "Applied Fireproofing."
- B. After sprayed fire-resistive materials are applied, remove only to extent necessary for installation of gypsum board shaft wall assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION

- A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and ASTM C 754 other than stud-spacing requirements.
 1. Provide stud spacing as follows:
 - a. 16 inches (406 mm) o.c., unless otherwise indicated or required to comply with span and deflection design criteria.
- B. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.
- C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door

stops, and similar items that cannot be supported directly by shaft wall assembly framing.

1. Elevator Hoistway: At elevator hoistway-entrance door frames, provide jamb struts on each side of door frame.
 2. Cant Panels: At projections into shaft exceeding 4 inches (102 mm), install 1/2- or 5/8-inch- (13- or 16-mm-) thick gypsum board cants covering tops of projections.
 - a. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches (610 mm) o.c. with screws fastened to shaft wall framing.
 - b. Where steel framing is required to support gypsum board cants, install framing at 24 inches (610 mm) o.c. and extend studs from the projection to shaft wall framing.
 3. Stairs: Where handrails directly attach to gypsum board shaft wall assemblies, provide galvanized steel reinforcing strip with 0.033-inch (0.84 mm) minimum thickness of base metal (uncoated), accurately positioned and secured behind at least one layer of face panel.
- D. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels, while maintaining continuity of fire-rated construction.
- F. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- G. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.
- H. Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.
- I. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.
- 3.4 PROTECTION
- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, or mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

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SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
3. Equipment backing plates.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Section 05 40 00 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.
5. Section 07 21 00 "Thermal Insulation" for insulation installed within studs.
6. Section 07 84 43 "Fire-Resistive Joint Systems" for head-of-wall joint systems installed with non-load-bearing steel framing.
7. Section 09 29 00 "Gypsum Board".
8. Section 09 21 16 "Gypsum Board Shaft Wall Assemblies" for non-load-bearing metal shaft-wall framing, gypsum panels, and other components of shaft-wall assemblies.

1.2 ACTION SUBMITTALS

- ###### A. Coordination: Submit related product data/shop drawings, specified in another Section simultaneously for approval.

1. Gypsum board product data for gypsum board to be used as part of non-structural metal framing.
 2. Gypsum board shaft wall product data for shaft walls related to non-structural metal framing.
- B. Product Data: Submit manufacturer's product data, typical installation details and other data for each type of product listed to show compliance with the requirements.
- C. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.

1.3 INFORMATION SUBMITTALS

- A. Span and Deflection Design Criteria: Provide height to load deflection charts showing studs supplied conform to deflection limit scheduled and allowed per ASTM C 754.

1. Mark on chart(s) showing all major partitions scheduled conformance with criteria.
2. Submit manufacturer's certification of stud size, thickness, and spacing complying with performance requirements and selections made by architect are correct for application shown.

B. Evaluation Reports: For firestop tracks, from ICC-ES.

C. Mill Certificates: Signed by manufacturers of steel certifying that products furnished comply with requirements.

1.4 QUALITY ASSURANCE

A. Installer's Qualifications: Firm and individuals with a minimum of 5 consecutive years experience in the installation of specified products on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance.

B. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer acceptable to the gypsum board manufacturer.

C. Mockups: Provide non-structural metal framing for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.

1. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring non-structural metal framing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 HANDLING

A. Delivery: Protect materials from excessive moisture in shipment, storage, and handling.

B. Storage: Store off ground, either in a dry, ventilated, enclosed space or protected with suitable waterproof coverings.

C. Handling: Protect non-structural framing members from rusting and damage.

1.6 SEQUENCING

A. Coordinate placement of concealed internal wall reinforcement, such as backing plates, for items to be attached to metal support systems.

B. Coordinate installation of ceiling and soffit suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorage to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

C. Furnish concrete inserts, and other devices indicated, to other trades for installation well in advance of time needed for coordination with other construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of design_Manufacturer: Subject to compliance with requirements, provide non-structural metal framing products by Clark Dietrich Metal Framing, Mill Certified, or comparable products by one of the following:
1. Clark Dietrich Metal Framing; a Worthington Industries Company.
 2. MarinoWARE.
 3. SCAFCO Corporation.
 4. Steel Network, Inc. (The).
 5. Other Manufacturer accepted by the Architect.

2.2 PERFORMANCE REQUIREMENTS

- A. LEED Requirements: Provide non-structural metal framing products and suspension systems with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
- B. Performance Requirements: Provide metal framing assemblies to withstand the loads prescribed within the specified deflection limits.
1. Deflection Limit per ASTM C 754: Allowing for 5 lbf/sq. ft (24 Pa) lateral load.
 - a. Typical Finishes: L/240.
 - b. Tile, Plaster, Stone or Similar Finishes: L/360.
 2. Where partition heights exceed stud manufacturer's recommended spans, and to resist deflection limits where equipment or handrails are mounted, or seismic forces, provide one of the following:
 - a. Heavier stud gage.
 - b. Closer stud spacing.
 - c. Deeper stud size (space permitting, as determined by Architect).
 - d. Above-ceiling bracing, anchored to structure above.
 3. Seismic Loads and design data are indicated on the Drawings.
- C. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
1. Conform to applicable code for fire rated assemblies. Construct assemblies to achieve fire resistance ratings indicated on Drawings in accordance with UL, GA, or other acceptable tested approved assemblies. Where no test number is referenced, utilize and submit a tested approved assembly that achieves the fire rating required by the Drawings, including the Life Safety Plan.
 2. Assemblies listed do not necessarily indicate all assemblies that may be used in this project. Contractor may propose alternate UL listed assemblies or approved tested assemblies that meet the same requirements to the Architect for consideration. Contractor may not substitute assemblies without written authorization by the Architect.
 3. Drawings, keys or written descriptions located in the Contract Documents to describe fire rated assemblies for beams, floors, roofs, columns, walls, partitions and through-penetration firestop systems do not necessarily call out each and every specific requirement of the designated UL listed assembly

identified or approved tested assemblies. It is the Contractor's responsibility to become thoroughly familiar with the corresponding requirements published in the most recent issue of the Underwriters Laboratories Inc. Fire Resistance Directory and construct the fire rated assemblies in strict accordance with those requirements.

4. Prescribed UL Design Numbers or approved tested assemblies which may be called for on this Project and may be required as determined during the construction process if existing conditions dictate. The list of assemblies below is not intended to represent all rated conditions designated in whole of the Contract Documents or those that may be considered viable alternates (where approved by Architect). UL listed fire rated assemblies or approved tested assemblies include, but are not limited to the following:
 - a. Wall Systems: Refer to Drawings.
 - b. Through-Penetrations Firestop Systems: Refer to Section 07 84 13 "Penetration Firestopping."
 - c. Fire-Resistive Joint Systems: Refer to Section 08 84 46 "Fire-Resistant Joint Sealants."

- D. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- E. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- F. LEED Performance Requirements
 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide interior metal framing products in wall and ceiling assemblies that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 3. LEED Requirements: Provide non-structural metal framing products with available third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
 4. LEED Requirements: Provide non-structural metal framing products with available manufacturer's product-specific Health Product Declarations (HPDs).

2.3 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal at interior studs unless otherwise indicated.
 2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized, unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Use either steel studs and tracks or embossed steel studs and tracks.

- C. Studs and Runners: ASTM C 645.
1. Steel Studs and Runners:
 - a. Minimum Base Metal Thickness: 0.033 inches unless otherwise indicated or required to comply with span and deflection design criteria, before application of protective coating.
 - b. Depth: 3-5/8 inches (92.1 mm) unless otherwise indicated or required to comply with span and deflection design criteria.
 2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.
 - a. Minimum Base-Metal Thickness: 0.0190 inch (0.483 mm).
 - b. Depth: 3-5/8 inches (92.1 mm) unless otherwise indicated or required to comply with span and deflection design criteria.
- D. Slip-Type Head Joints: Where indicated, provide one of the following:
1. Double-Runner System: ASTM C 645 top runners, inside runner with 4-inch-(101-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 2. Proprietary Deflection Track/Clips: Steel sheet top runner and clip system manufactured to prevent cracking of gypsum board applied to interior partitions resulting from deflection of structure above; in thickness indicated for studs and in width to accommodate depth of studs.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Dietrich Metal Framing, "Fast Stop" clips, 0.064 inches (1.63 mm) thick, used in conjunction with 0.033 inch (0.8 mm) thick deep leg track.
 - 2) Marino / WARE WSC-DEFLEX Series slide clips, used in conjunction with 0.033 inch (0.8 mm) thick deep leg track.
 - 3) Steel Network Inc. (The); VertiClip SLD or VertiTrack VTD Series.
 - 4) Stockton Products, Flexible Trak, FLT.
 3. Substitutions: None permitted.
 4. Single Deep-Leg Track: Not permitted.
- E. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
 - b. The Steel Network, Inc.; VertiClip SLD Series or VertiTrack VTD Series.
 - c. Substitutions: Comparable product from another steel framing manufacturer listed, provided track system has been tested as part of an assembly according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Single Deep-Leg Track: Not permitted.
- F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm)
 - G. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 1. Depth: 1-1/2 inches (38 mm).
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068 inch- (1.72-mm-) thick, galvanized steel.
 - H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 1. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm)
 2. Depth: 7/8 inch (22.2 mm).
 - I. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
 1. Configuration: Asymmetrical or hat shaped, with face attached to single flange by a slotted leg (web) or attached to two flanges by slotted or expanded metal legs.
 - J. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 1. Depth: 3/4 inch (19 mm).
 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062 inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21 mm-) diameter wire.
 - K. Flexible Track for Studs: Galvanized steel flexible track and strap system designed to receive studs for framing curves; component sizes as indicated on Drawings.
 1. Galvanized Steel: ASTM A 653, gage and grade as required for application.
 2. Acceptable Product: Flex-Ability Concepts ; Flex-C Trac.
 - L. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.
- 2.4 SUSPENSION SYSTEMS
- A. Primary Suspension Members for Ceilings:
 1. General: Size and provide ceiling support components to comply with ASTM C754.
 - B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
 - C. Hanger Attachments to Concrete:
 1. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to

10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

- D. Hangers: As follows:
1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
 2. Rod Hangers: ASTM A 510 (ASTM A 510M), mild carbon steel.
 - a. Diameter: 1/4-inch (6-mm).
 - b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
 3. Flat Hangers: Commercial-steel sheet, ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized.
 - a. Size: 1 by 3/16 inch (25 by 5 mm) by length indicated.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.054 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating.
1. Depth: 2-1/2 inches (64 mm).
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.054-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 2. Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
 - b. Depth: 1-5/8 inches (41 mm) unless noted otherwise.
 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
 4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
 - a. Configuration: Hat shaped, with face attached to two flanges by slotted or expanded metal legs.
- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock. Note: #8 gage hanger wire shall be required if spacing exceeds 3'x3' or 9 sf of ceiling area.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Armstrong World Industries, Inc.; Drywall Grid Systems.
 - b. Chicago Metallic Corporation; Drywall Grid System.
 - c. USG Corporation; Drywall Suspension System.
 2. Provide compression struts and sway bracing to resist seismic forces.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.
- C. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Pecora Corporation; AC-20 FTR.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. USG Corporation; SHEETROCK Acoustical Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
 1. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install bracing at terminations in assemblies.
- C. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

- D. Installation Tolerances: Install each steel partition, soffit, and ceiling framing and furring members to comply with the following:
 - 1. Variation in Level, Plumb, and True to Line: Maximum 1/8 inch (3 mm) in 10 feet (1:960).
 - 2. Variation in Plane of Adjacent Fastening Surfaces: Not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
 - 3. Variation in Framing and Furring Spacing: Not more than 1/8 inch (3 mm).

3.4 INSTALLING STEEL PARTITION FRAMED ASSEMBLIES

- A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.
 - 1. Where studs are installed directly against exterior walls or dissimilar metals, install asphalt-felt or foam-gasket isolation strip between studs and wall.
- B. Acoustical Sealant Installation at Sound Walls: Install in accordance with ASTM C 919.
 - 1. Place two beads of acoustic sealant between runners and substrate studs and adjacent construction to achieve an acoustic seal.
 - 2. Place two beads of acoustic sealant between studs and adjacent vertical surfaces board to achieve an acoustic seal.
 - 3. As detailed on Drawings.
- C. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
 - 1. Space studs as follows:
 - a. Single-Layer Construction: 16 inches (406 mm) o.c., unless otherwise indicated or required to comply with span and deflection design criteria.
 - b. Multilayer Construction: 16 inches (406 mm) o.c., unless otherwise indicated or required to comply with span and deflection design criteria.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - a. Use double runner system or proprietary deflection track at all locations except fire rated partitions.
 - b. Use approved firestop track at fire rated partitions.
 - c. Reference details on Drawings.
 - 2. Door Openings:
 - a. Rough openings up to 50 inches (1270-mm) wide:
 - 1) Jamb: Install two boxed studs, minimum of 0.033 inches (0.84-mm) thick at each jamb unless otherwise indicated or required to comply with span and deflection design criteria.
 - a) Extend jamb studs to underside of overhead structure and attach.
 - b) Screw vertical studs at jambs to jamb anchor clips on door frames.

- 2) Header: Install runner track section minimum of 0.033 inches (0.84-mm) thick or a box stud header, minimum of 0.018 inches (0.45 mm) thick, (for cripple studs) at head and secure to jamb.
 - a) Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
- b. Rough openings over 50 inches (1270-mm) to 74 inches (1880-mm) wide:
 - 1) Jamb: Install two boxed studs, minimum of 0.054 inches (1.37-mm) thick at each jamb unless otherwise indicated or required to comply with span and deflection design criteria.
 - a) Extend jamb studs to underside of overhead structure and attach.
 - b) Screw vertical studs at jambs to jamb anchor clips on door frames.
 - 2) Header: Install a box stud header minimum of 0.054 inches (1.37 mm) thick, unless otherwise indicated.
 - a) Secure box header to jamb studs.
 - b) Install runner track section (for cripple studs) at head and secure to jamb studs.
 - c) Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
- c. Rough openings over 74 inches (1880 mm) wide and all lead lined and automatic doors:
 - 1) Jamb: Install two boxed studs, minimum of 0.068 inches (1.72-mm) thick at each jamb unless otherwise indicated or required to comply with span and deflection design criteria or C3x5 steel channel.
 - a) Extend jamb studs to underside of overhead structure and attach.
 - b) Screw vertical studs at jambs to jamb anchor clips on door frames.
 - 2) Header: Install a box stud header minimum of 0.068 inches (1.72-mm) thick, unless otherwise indicated or C4x5.4 steel channel.
 - a) Secure box header to jamb studs.
 - b) Install runner track section (for cripple studs) at head and secure to jamb studs.
 - c) Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Partitions Scheduled to Receive:
 - a. Tile Finish: Provide minimum of 0.033 inches (0.84 mm) thick studs.
 - b. Cementitious Backer Units: Provide minimum of 0.033 inches (0.84 mm) thick studs.
 - c. Bumper or Guard Rails: Provide minimum of 0.033 inches (0.84 mm) thick studs.

- d. Equipment: Where wall mounted equipment, woodwork, and casework items are indicated or elsewhere as shown on Drawings, provide minimum of 0.033 inches (0.84 mm) thick studs.
- 5. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure, unless noted otherwise.
 - a. Firestop Track: Install to maintain continuity of fire-resistance-rated assembly indicated.
- 6. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- 7. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.
- E. Direct Furring:
 - 1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

3.5 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - 3. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 - 4. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 5. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are

- secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
6. Do not attach hangers to steel roof deck.
 7. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 8. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 9. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support. Provide compression struts installed at 12 feet on center each way to secure ceilings and soffits
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- 3.6 METAL BACKING PLATES:
- A. Provide metal backing plates to support loads imposed at wall-mounted and wall-hung items that require backing plates, include, without limitation, the following:
1. Stereo cabinets.
 2. Toilet accessories, except grab bars.
 3. Metal lockers.
 4. Fire protection specialties.
 5. Markerboards.
 6. Tackboards.
 7. Millwork, other than upper cabinets.
 8. Medical equipment.
 9. Metal cabinets.
 10. Computer equipment wall mounting brackets.
 11. Medical equipment rails.
 12. Wall protection.
- B. Backing plates not provided with fixtures and equipment shall be long enough to span across a minimum of 3 studs, unless otherwise indicated, and may be one of the following:
1. Galvanized steel plate 0.053-inch (1.34-mm) thick minimum by 4 inches wide.
 2. 3-5/8 inches (92.1 mm) un-punched wide flange steel stud of 0.053 inch (1.34-mm) thick.
 3. At Contractor's option, solid wood blocking may be used in lieu of metal backing plates. Refer to Section 06 10 53 "Miscellaneous Carpentry."
- C. Wood blocking will be acceptable at the following locations only:
1. Television equipment.
 2. Wall-mounted door stops.
 3. Wall-mounted grab bars.
 4. Upper wall millwork / casework units.
 5. Wall-mounted handrails.

6. Wall-mounted ladders.
- D. Install backing plate so that it will be flush with exterior face of stud.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 06 16 00 "Sheathing" for gypsum sheathing for exterior walls.
4. Section 09 22 16 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.
5. Section 09 21 16 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of gypsum board product, including related accessories. Furnish a material list with technical data documenting the location and primary function, quality, and performance of each material component or system to be used in the Work, or other such primary characteristics as required by the Drawings or Specifications.

1. Submit manufacturer's technical data for each gypsum drywall partition and each ceiling system.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS -

LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.

- C. Samples: For the following products:
 1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
 2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- B. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- C. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in

assembly indicated on Drawings in according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Possible alternate assemblies indicated by design designations from GA-600, "Fire Resistance Design Manual" may be submitted per substitution requirements.
- D. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated on Drawings in according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
1. Possible alternate assemblies indicated by design designations from GA-600, "Fire Resistance Design Manual" may be submitted per substitution requirements.
- E. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each texture finish indicated.
 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 3. Simulate finished lighting conditions for review of mockups.
 4. Provide gypsum board for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - a. Mockups: See Section 01 43 39 "Room Mockup requirements" for room mockups requiring metal fabrications.
 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
1. Conform to applicable code for fire rated assemblies. Construct assemblies to achieve fire resistance ratings indicated on Drawings in accordance with UL, GA, or other acceptable tested approved assemblies. Where no test number is referenced, utilize and submit a tested approved assembly that achieves the fire rating required by the Drawings, including the Life Safety Plan.
 2. Assemblies listed do not necessarily indicate all assemblies that may be used in this project. Contractor may propose alternate UL listed assemblies that meet the same requirements to the Architect for consideration. Contractor may not substitute assemblies without written authorization by the Architect.
 3. Drawings, keys or written descriptions located in the Contract Documents to describe fire rated assemblies for beams, floors, roofs, columns, walls, partitions and through-penetration firestop systems do not necessarily call out each and every specific requirement of the designated UL listed or other approved tested assembly identified. It is the Contractor's responsibility to become thoroughly familiar with the corresponding requirements published in the most recent issue of the Underwriters Laboratories Inc. Fire Resistance Directory and construct the fire rated assemblies in strict accordance with those requirements and conforms to assemblies indicated on Drawings.
 4. Prescribed UL Design Numbers or other tested design which may be called for on this Project and may be required as determined during the construction process if existing conditions dictate. The UL assemblies or other tested designs indicated in the Contract Documents are not intended to represent all rated conditions designated in the Contract Documents or those that may be considered viable alternates (where approved by Architect). UL listed fire rated assemblies include, but are not limited to the following:
 - a. Wall Systems: Refer to Drawings.
 - b. Through-Penetrations Firestop Systems: Refer to Section 07 84 13 "Penetration Firestopping."
 - c. Fire-Resistive Joint Systems: Refer to Section 07 84 46 "Fire-Resistant Joint Sealants."
- B. STC-Rated Assemblies: For STC-rated assemblies indicated on Drawings or approved tested assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. LEED Performance Requirements
1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide interior gypsum board products in wall or ceiling assemblies that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

3. Provide Gypsum board products and metal trim products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
4. Provide available gypsum board products with manufacturer's product-specific Health Product Declarations (HPDs).
5. Provide available gypsum board products with Greenguard Gold Certification.

2.2 GYPSUM BOARD, GENERAL

- A. Recycled Content: Postconsumer recycled content plus preconsumer recycled content not less than 90 percent for paper faced board.
- B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Basis of Design Manufacturers: Subject to compliance with requirements, provide products Georgia-Pacific Gypsum LLC, or comparable products by one of the following:
 1. American Gypsum.
 2. CertainTeed Corp.
 3. Georgia-Pacific Gypsum LLC.
 4. Lafarge North America Inc.
 5. National Gypsum Company.
 6. USG Corporation.
- B. Gypsum Board, Type X [**GYP BD-1**]: ASTM C 1396/C 1396M.
 1. Thickness: 5/8 inch (15.9 mm).
 2. Long Edges: Tapered

2.4 SPECIALTY GYPSUM BOARD

- A. Glass-Mat Interior Gypsum Board [**GYP BD-2**]: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Georgia-Pacific Gypsum LLC; DensArmour Plus.
 - b. Temple-Inland; GreenGlass Interior Glass-Mat Board.
 2. Core: 5/8 inch (15.9 mm), Type X.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Acoustically Enhanced Gypsum Board [**GYP BD-3**]: ASTM C 1396/C 1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.
 1. Core: 5/8 inch (15.9 mm), Type X.
 2. Long Edges: Tapered.

2.5 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board [**GYP BD-4**]: ASTM C 1178/C 1178M, with manufacturer's standard edges.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; Diamondback GlasRoc Tile Backer.
 - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 - c. National Gypsum; e2XP Tile Backer.
 - d. Temple-Inland; GreenGlass Fiberglass-Faced Tile Backer
 2. Core: 5/8 inch (15.9 mm), Type X.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Cementitious Backer Units [**CBU-1**]: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C-Cure.
 - b. CertainTeed Corporation.
 - c. National Gypsum Company.
 - d. USG Corporation.
 2. Thickness: 5/8 inch (15.9 mm).
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes:
 - a. Control (expansion) joints.
 - b. Cornerbead.
 - c. Bullnose bead.
 - d. LC-Bead (J-Bead): J-shaped; exposed long flange receives joint compound.
 - e. L-Bead: L-shaped; exposed long flange receives joint compound.
 - f. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.
 - h. Curved Inside Corner:
 - 1) Acceptable Product: Fry Reglet, DRMCIS-200.
- B. Vinyl Trim: ASTM C 1047.
1. Manufacturer: Trim-Tex.
 - a. Super Seal Tear Away L Bead.
 - b. Wall Mounted Deflection Bead.
 - c. Shapes indicated on the Drawings.
- C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Fry Reglet Corp.
- b. Gordon, Inc.
- c. Pittcon Industries.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.
4. Shapes:
 - a. Fry Reglet control joint DRM625-50.
 - b. Fry Reglet top reveal DRMF-625-625.
 - c. Fry Reglet Z reveal DRMZ-625-625.
 - d. Fry Reglet Reveal Trim DA-1.
 - 1) Dimensions as indicated on the Drawings.
 - e. Shapes indicated on the Drawings.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper.
 2. Glass-Mat Gypsum Board: 10-by-10 glass mesh.
 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 4. Finish Coat: For third coat, use setting-type, sandable topping compound, or use drying-type, all-purpose compound.
 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Adhesives and Sealants: Use adhesives and sealants that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- C. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- D. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- E. Electrical Box Pads: Putty Pads: Moldable non-curing one component, intumescent, fire-rated material for through-penetration fire stop systems and sound attenuation systems; self-adhering; 1/8 inch thick minimum.
- F. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Provide slag-wool-fiber/rock-wool-fiber insulation with recycled content so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.
 - 2. Formaldehyde Free: Provide formaldehyde-free products, or low emitting products when tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.
 - 3. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly. With thermal conductivity of "k" = 0.25 Btu in./hr. ft.² °F. at 75 deg. F. Minimum 3 pcf density.
 - 4. Fire response characteristics: ASTM E84, flame spread 15, smoke developed 10, or less.
 - 5. Provide manufacturer's standard sizes in thickness indicated. Provide one of the following:
 - a. Thermafiber LLC; Sound Attenuation Fire Blankets.
 - b. Fibrex Inc.; FBX Sound Control Blanket.
 - c. Roxul Inc.; Acoustical Fire Batt.
- G. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Hilti Incorporated; CP 506 Smoke and Acoustic Sealant.
 - d. Pecora Corporation; AC-20 FTR.
 - e. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - f. Tremco; Acoustical Sealant.
 - g. USG Corporation; SHEETROCK Acoustical Sealant.
- H. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PUTTY PADS FOR SMOKE / FIRE-RATED AND STC-RATED WALLS

- A. Prior to installing wallboards, install putty pads in accordance with manufacturer's written instructions.
- B. Overlap front edge of box so that putty will be compressed around edges of box as gypsum panels are installed.

3.3 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch (6.4- to 9.5-mm-) wide joints to install sealant.

- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch (6.4- to 12.7-mm-) wide spaces at these locations, unless otherwise indicated on Drawings, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated and Smoke Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.4 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: Vertical and horizontal surfaces unless otherwise indicated.
 - 2. Flexible Type: Apply in double layer at curved assemblies where indicated on drawings.
 - 3. Glass-Mat Interior Type:
 - a. Interior side (face) of exterior walls.
 - b. Interior partitions where Contractor desires to install gypsum board prior to building dry-in.
 - c. On tile walls, and solid-surfacing faced walls, unless noted otherwise.
 - d. Wet locations 4'-0" to each side of water source.
 - e. At Interior Finish System locations.
 - f. First layer at locations where tile backer is the second layer.
 - g. Where indicated.
 - 4. Tile Backer-Glass-Mat Type:
 - a. Interior exposed Walls in toilet room with shower.
 - b. Interior exposed Walls in toilet room with solid-surfacing faced walls.
 - c. Interior exposed Tiled walls in showers and bathtubs.
 - d. Interior exposed walls behind prefabricated shower or bathtub units.
 - e. Plumbing walls of toilet rooms.
 - f. Where indicated.
 - 5. Cementitious Backer Units:
 - a. Exterior exposed Walls in toilet room with shower.
 - b. Exterior exposed Walls in toilet room with solid-surfacing faced walls.
 - c. Exterior exposed Tiled walls or solid-surfacing faced walls in showers and bathtubs.
 - d. Exterior exposed walls behind prefabricated shower or bathtub units.
 - e. Where indicated.
- B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- 3.5 APPLYING TILE BACKING PANELS
- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
1. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.
 2. Do not install screws within 6 inches of the shower wall base so as to not penetrate shower pan waterproofing.
- B. Cementitious Backer Units: ANSI A108.11, Where indicated.
- 3.6 INSTALLING TRIM ACCESSORIES
- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

- B. Control Joints: Install control joints as indicated on Drawings. If not indicated install according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. Bullnose Bead: Use at outside corners.
 - 3. LC-Bead (J-Bead): J-shaped: Use at exposed panel edges.
 - 4. L-Bead: L-shaped: Use where indicated.
 - 5. U-Bead: J-shaped: Use at exposed panel edges where indicated.
 - 6. Curved-Edge Cornerbead: Use at curved openings.
 - 7. Curved Inside Corner: Use where indicated.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.7 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies. Level 1 finish shall be applied at ceiling plenum areas, concealed areas.
 - 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges. Level 2 finish shall be applied to WR gypsum board, where panels are substrate for tile, and other locations where indicated.
 - 3. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges. Joint compound shall be smooth and free from tool marks and ridges. Level 3 finish shall be applied to panels in Mechanical Rooms, Electrical Rooms, and similar spaces.
 - 4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges. Joint compound shall be smooth and free from tool marks and ridges. Level 4 finish shall be applied to panels in all locations except where another level of finish is specified.
 - a. Primer and its application to surfaces are specified in other Section 09 91 00 "Painting."
 - 5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where indicated. Level 5 finish shall be applied at exposed locations utilizing glass mat interior gypsum board products. At all exposed drywall surfaces within main entrance hallways, elevator corridors,

and areas scheduled to receive accent lighting, display wall coatings, graphic painting, gloss or semi-gloss finishes, refer to room finish schedules for locations. Where indicated on Drawings.

- a. Primer and its application to surfaces are specified in other Section 09 91 00 "Painting."

- E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before installing gypsum board ceilings, conduct an above-ceiling inspection, and report and correct deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
 1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for Contractor's above-ceiling inspection. Provide Architect with copy of deficiencies report. Architect reserves the right to supplement Contractor's deficiency report with other incomplete or incorrect items that might be observed during Architect's site visit.
 2. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air-duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control-air tubing.
 - f. Installation of ceiling support framing.
 - g. Installation of seismic restraints (sway bracing and compression struts).
 - h. Touch-up / patching of spray fire-resistive materials (SFRM).
 - i. Installation of penetration firestopping in fire- and smoke-rated partitions.
 - j. Installation of fire-resistant joint sealants in fire-rated partitions.
 - k. Installation of acoustical sealants at adjacent sound-rated partitions.

3.9 ACOUSTIC TESTING

- A. The Owner may have periodic sound tests made, at his option, as the work progresses. The Contractor shall make necessary modifications of partitions that are found to be substandard (not meeting approximate sound attenuation levels established by tests listed in manufacturer's data sheets) for that particular partition construction.
 1. Costs of testing of partitions when found to be substandard shall be paid for by the Contractor, including cost of retesting of modified partitions.
 2. Cost of testing partitions found to comply with sound attenuation levels required, will be paid for by the Owner.

3.10 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 30 13

CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Porcelain Paver tile.
 2. Porcelain wall tile.
 3. Glass Tile.
 4. Waterproofing/Crack isolation membrane.
 5. Metal edge strips.
- B. Sustainable Building Requirements:
1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 4. Division 03 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
 5. Division 09 Section "Gypsum Board" for glass-mat, water-resistant backer board.
 6. Division 10 Section "Toilet Partitions" for toilet partitions and attachments at tile work.
 7. Division 10 Section "Toilet and Bath Accessories" for toilet, bath and shower accessories mounted in tile work.

1.2 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.
- E. Wet Area: Tile surfaces that are either soaked, saturated, or regularly and frequently subjected to moisture or liquids (including water), such as gang showers, tub enclosures, showers, laundries, saunas, steam rooms, swimming pools, hot tubs, and exterior areas.
- F. Polished Finish: Smooth surface that produces sharp, mirrorlike reflections. Reflected images of overhead fluorescent tubes have straight lines without visible distortion when viewed at arm's length.
- G. Honed Finish: Smooth, nonreflective surface similar to that produced by grinding with a 400- to 1200-grit abrasive; with a gap not exceeding 0.005 inch (0.13 mm) when faces are tested for flatness with a 24-inch (600-mm) straightedge.
- H. Sand-Rubbed Finish: Uniform, fine-textured surface similar to that produced by grinding with a 40-grit abrasive; with a gap not exceeding 1/32 inch (0.8 mm) when faces are tested for flatness with a 24-inch (600-mm) straightedge.

1.3 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.6.
 - 2. Step Treads: Minimum 0.6.
 - 3. Ramp Surfaces: Minimum 0.8.
- B. Dynamic Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ANSI A137.1:
 - 1. Dynamic Coefficient of Friction: Not less than 0.42.
- C. Load-Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for the following load-bearing performance level based on testing assemblies according to ASTM C 627 that are representative of those indicated for this Project:
 - 1. Extra Heavy: Passes cycles 1 through 14.
 - 2. Heavy: Passes cycles 1 through 12.

3. Moderate: Passes cycles 1 through 10.
4. Light: Passes cycles 1 through 6.
5. Residential: Passes cycles 1 through 3.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- D. Samples for Initial Selection: For each type of grout and sealant indicated.
- E. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of tile in each finish required.
3. Full-size units of each type of trim and accessory.
4. Thresholds in 6-inch (150-mm) lengths.
5. Metal edge strips in 6-inch (150-mm) lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product, signed by product manufacturer.
- D. Certification: Copies of waterproofing membrane manufacturer's certification that the anti-fracture and/or waterproofing membrane materials are compatible with the setting materials to be used in the installation
- E. Material Test Reports: For each tile-setting and grouting product.
- F. Fired substrate moisture and alkalinity testing report.

1.6 QUALITY ASSURANCE

- A. Provide material and installation complying with following:
 1. Tile Council of North America Inc. (TCNA):
 - a. Handbook for Ceramic Tile Installation, current edition.
 2. American National Standards Institute Specifications for:
 - a. Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile Installed with Portland Cement Mortar, A108.1:
 - 1) Ceramic Mosaic Tile Installed with Dry-Set Portland Cement Mortar, or Latex-Portland Cement Mortar, A108.5
 - 2) Latex-Portland Cement Mortar, A118.4
 - 3) Waterproofing Membrane, A118.10
 - 4) Anti-Fracture Membrane: A118.12
 - 5) Epoxy Mortar and Grout, A108.6 & A118.8
 - 6) Recommended Standard Specifications for Ceramic Tile, A137.1
- B. Installer Qualifications: Engage an experienced installer having a minimum of 5 years experience on projects of comparable size and scope who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- C. Supplier Qualifications: A firm experienced in supplying products similar to those indicated for the Project and with a record of successful in-service performance.
- D. Source Limitations for Tile: Obtain tile of each type from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
 - E. Source Limitations for Setting and Grouting Materials: Installation System Manufacturer / Company specializing in adhesives, mortars, grouts and other installation materials with Twenty Five (25) years minimum experience and ISO 9001 certification. Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
 1. Source Limitations: For each tile installation, obtain compatible formulations of setting and grouting materials containing latex or latex additives from a single manufacturer, obtain waterproof membrane and crack isolation membrane from the same manufacturer.
 - F. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
 1. Thresholds.
 2. Joint sealants.
 3. Metal edge strips.
 - G. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Build mockup of each type of floor tile installation.
 2. Build mockup of each type of wall tile installation.
 3. Provide ceramic tiling for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - a. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring ceramic tiling.
 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 - H. Preinstallation Conference: Conduct conference at Project site.
 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
 - B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
 - C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
 - D. Store liquid materials in unopened containers and protected from freezing.

- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
 - 1. Maintain ambient temperatures not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C) during installation and for a minimum of seven (7) days after completion.

1.9 SEQUENCING AND SCHEDULING

- A. Sequence tile installation with other work to minimize possibility of damage and soiling during remainder of construction period.
- B. Install tile and accessories only after other finishing operations, including painting, have been completed.

1.10 EXTRA MATERIALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated in unopened packages.

1.11 WARRANTY

- A. Installation System Manufacturer of adhesives, mortars, grouts and other installation materials shall provide a written warranty covering materials and labor.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.

2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 PERFORMANCE REQUIREMENTS

- A. LEED Performance Requirements
 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide interior ceramic tiling products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 3. Provide available tile products and installation products with manufacturer's product-specific Health Product Declarations (HPDs).
- B. FloorScore Compliance: Floor Tile Systems shall comply with requirements of FloorScore Standard.

2.3 TILE PRODUCTS

- A. Basis of Design Products: As listed in the Materials Legend, on the Drawings.
- B. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
 1. Provide as indicated in Finish Legend, unless otherwise indicated.

- C. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
 2. Shapes: As follows, selected from manufacturer's standard shapes:
 - a. Base for Thin-Set Mortar Installations: Coved, unless straight is indicated.
 - b. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
 - 1) Metal edge strips when indicated.
 - c. External Corners for Thin-Set Mortar Installations: Surface bullnose.
 - d. Internal Corners: Field-buttet square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.

2.4 THRESHOLDS AND EDGE PROTECTION

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
1. Material: Custom prefabricated terrazzo.
 2. Edges: Beveled.
 - a. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to **1/16 inch (1.5 mm)** above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to **1/2 inch (12.7 mm)** or less above adjacent floor surface.
 3. Color: Match Architects sample.
- B. Metal Edge Protection: Roll-formed Type 304 stainless steel, height as required to accept scheduled tile thickness.
1. Product: As indicated on the Drawings.

2.5 SLOPED TOPPING

- A. Portland Cement Mortar (Topping) Installation Materials: ANSI A108.02.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete 3701 Fortified Mortar Bed or comparable product by the following:
 - a. Ardex.
 - b. Laticrete International, Inc.
- B. Slurry Bond Coat:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete 254 Platinum Thin Set Mortar or comparable product by the following:
 - a. Ardex.
 - b. Laticrete International, Inc.

2.6 WATERPROOFING AND CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard GREENGUARD GOLD certified low VOC product that complies with ANSI A118.10, ANSI A118.12 and ASTM C627, TCA Extra Heavy Service and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer).
- B. Fluid-Applied Membrane **[CTWP-1]**:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete 9235 Waterproofing Membrane or comparable product by the following:
 - a. Ardex.
 - b. Laticrete International, Inc.

2.7 SETTING MATERIALS

- A. General: Manufacturer's standard GREENGUARD GOLD certified low VOC product that complies with ANSI A118.3, ANSI A118.4 and ANSI A118.5, TCA Extra Heavy Service and is recommended by the manufacturer for the application indicated.
- B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete 254 Platinum Multipurpose Thin Set Mortar, GREENGUARD GOLD certified low VOC or comparable product by the following:
 - a. Ardex.
 - b. Laticrete International, Inc.
 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
- C. Polymer Modified Adhesive Mortar for Glass Tile (Thin Set): ANSI A118.4.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete Glass Tile Adhesive, GREENGUARD GOLD certified low VOC or comparable product by the following:
 - a. Ardex.
 - b. Laticrete International, Inc.
 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
- D. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete; LATAPOXY® 300 Adhesive or comparable product by one of the following:
 - a. Ardex.
 - b. Laticrete International, Inc.

2.8 GROUT MATERIALS

- A. Water-Cleanable Epoxy Grout: ANSI A118.3.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete SpectraLock Pro Grout, GREENGUARD certified low VOC or comparable product by the following:
 - a. Ardex.
 - b. Laticrete International, Inc.

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F and 212 deg F, respectively, and certified by manufacturer for intended use.

2.9 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."
 1. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete Latisil or comparable product by the following:
 - a. Ardex.
 - b. Laticrete International, Inc.
 2. Colors: As selected by Architect from a minimum of 20 standard colors.

2.10 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
 1. Basis of design: LATICRETE NXT Patch as manufactured by LATICRETE International or comparable product by the following:
 - a. Ardex.
 - b. Laticrete International, Inc.
- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- C. Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.11 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that water resistant glass-mat gypsum wallboard and tile backer board is installed and prepared in accordance with Gypsum Association GA 216-75.
 - 4. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 5. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
 - 6. Clean existing concrete surfaces by abrasive blasting.
- B. Substrate Moisture and pH Testing:
 - 1. Perform relative humidity test using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - a. Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than two tests in each installation area and with test areas evenly spaced in installation areas.
 - b. Utilize in-situ testing probes manufactured by Wagner.
 - 2. Provide pH testing of substrate.

3. Provide a diagram of the building verifying each testing location with its results.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 SLOPED TOPPING INSTALLATION

- A. Install sloped topping in floor recesses to receive ceramic tile finish.
 1. Install Bonded Fortified Mortar Bed according to Manufacturer's instructions.
 2. Examination: Verify that floor drains are installed in correct location and at correct height for installation of topping and tile. Verify that recesses are of correct dimension and depth. Verify that concrete finish profile is appropriate for bonding. Proceed with installation only after unsatisfactory conditions have been corrected.
 3. Preparation: Clean surface of concrete sealers, curing compounds and other materials which could inhibit bond.
 4. Dampen surface: Wet the substrate and sweep off excess water.
 5. Slurry bond coat: Apply slurry bond coat to concrete substrate.
 6. Mix Fortified Mortar Bed to dry pack consistency.
 7. Apply mortar while slurry coat is wet and sticky, spread and compact well.
 8. Cure mortar bed according to manufacturer's instructions.

3.4 WATERPROOFING AND CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors composed of tiles **8 by 8 inches (200 by 200 mm)** or larger.
 - c. Tile floors composed of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
 2. Paver Tile: 1/8-inch (3.2 mm).
 3. Glazed Wall Tile: 1/16 inch (1.6 mm).
 4. Decorative Thin Wall Tile: 1/16 inch (1.6 mm).
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants." Sealant material is specified in this section.
- H. Thresholds: Install thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
 2. Do not extend waterproofing or crack isolation membrane under thresholds set in latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on waterproofing or crack isolation membrane with elastomeric sealant.
- I. Metal Edge Strips: Install at locations indicated where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile and where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

3.6 CLEANING

- A. Remove and replace material that is stained or otherwise damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.7 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
 - 1. Tile Installation F115: Thin-set mortar; epoxy grout; TCA F115.
 - a. Thin-Set Mortar: Latex- portland cement mortar.
 - b. Grout: Water-cleanable epoxy grout.
 - c. Waterproofing/Crack Suppression Membrane: Full coverage.
- B. Shower Floor Installations, Concrete Subfloor (sloped):
 - 1. Tile Installation F122: Thin-set mortar on waterproof membrane; TCA F122.
 - a. Thin-Set Mortar: Latex- portland cement mortar.
 - b. Grout: Water-cleanable epoxy grout.
 - c. Waterproof membrane.
- C. Toilet Room/Shower Floor Installations, Concrete Subfloor (recessed):
 - 1. Sloped topping.
 - 2. Tile Installation F122: Thin-set mortar on waterproof membrane; TCA F122.
 - a. Thin-Set Mortar: Latex- portland cement mortar.
 - b. Grout: Water-cleanable epoxy grout.
 - c. Waterproof membrane.
- D. Interior Wall Installations, Metal Studs or Furring:
 - 1. Tile Installation W245: Thin-set mortar on coated glass-mat, water-resistant gypsum backer board; TCA W245.
 - a. Thin-Set Mortar: Latex- portland cement mortar.
 - b. Grout: Water-cleanable epoxy grout.
- E. Interior Wall Installations, Metal Studs or Furring for Glass Tile:
 - 1. Tile Installation W245: Thin-set glass tile adhesive on coated glass-mat, water-resistant gypsum backer board; TCA W245.
 - a. Thin-Set Mortar: Latex- portland cement mortar.
 - b. Grout: Water-cleanable epoxy grout.
- F. Shower Wall Installations, Metal Studs or Furring:
 - 1. Tile Installation W244C: Thin-set mortar on cementitious backer board; TCA W244C.
 - a. Thin-Set Mortar: Latex- portland cement mortar.
 - b. Grout: Water-cleanable epoxy grout.
 - c. Waterproofing/Crack isolation membrane: Full coverage, (extend 2-feet beyond shower area).
- G. Shower Wall Installations, Masonry or Concrete:
 - 1. Tile Installation W202 Plus waterproof membrane: Thin-set mortar; TCA W202 Plus waterproof membrane.
 - a. Thin-Set Mortar: Latex- portland cement mortar.
 - b. Grout: Water-cleanable epoxy grout.
 - c. Waterproofing/Crack isolation membrane: Full coverage, (extend 2-feet beyond shower area).

END OF SECTION

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SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.
 - 1. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.

- b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Samples: For each exposed product and for each color and texture specified, 150 mm (6 inches) in size.
- D. Samples for Initial Selection: For components with factory-applied color finishes.
- E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
- 1. Acoustical Panel: Set of 150-mm- (6-inch-) square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 150-mm- (6-inch-) long Samples of each type, finish, and color.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Suspended ceiling components.
 - 2. Structural members to which suspension systems will be attached.
 - 3. Size and location of initial access modules for acoustical panels.
 - 4. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.

- d. Sprinklers.
 - e. Access panels.
 - 5. Perimeter moldings.
 - B. Qualification Data: For testing agency.
 - C. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.
 - D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
 - E. Field quality-control reports.
- 1.5 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For finishes to include in maintenance manuals.
- 1.6 MAINTENANCE MATERIAL SUBMITTALS
- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: Full-size panels equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
 - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.
 - 4. Impact Clips: Equal to 2 percent of quantity installed.
- 1.7 QUALITY ASSURANCE
- A. Testing Agency Qualifications: Qualified according to NVLAP for testing indicated.
 - B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of typical ceiling area as shown on Drawings, for each acoustical ceiling panel type.
 - 2. Provide acoustical panel ceilings for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - a. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring acoustical panel ceilings.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
 - 2. CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings – Seismic Zones 0-2."
 - 3. CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies – Seismic Zones 3 & 4."
- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Comply with ASTM E 1264 for Class A materials.
 - a. Flame-Spread Index: 25 or less
 - b. Smoke-Developed Index: 450 or less.
- D. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide interior acoustical panel ceiling and suspension products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 3. LEED Requirements: Provide interior acoustical panel ceiling and suspension products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).

4. LEED Requirements: Provide interior acoustical panel ceiling and suspension products with Greenguard Gold Certification.

2.2 ACOUSTICAL PANELS, GENERAL

- A. Recycled Content: Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 30 percent by weight, minimum average for mineral acoustical panels.
- B. Source Limitations:
 1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
 2. Suspension System: Obtain each type from single source from single manufacturer.
- C. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- D. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 400 mm (15-3/4 inches) away from test surface according to ASTM E 795.
- E. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL PANELS

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Basis of Design Products: Subject to compliance with requirements, provide the products indicated for each designation in the Materials Legend, on the Drawings, or a comparable product by one of the listed acceptable manufacturers.
- C. Acceptable Manufacturer:
 1. Armstrong World Industries, Inc.
 2. CertainTeed Corp.
 3. USG Interiors, Inc.; Subsidiary of USG Corporation.
 4. Other Manufacturers listed in the Materials Legend, on the Drawings.
- D. Colors: As indicated in the Materials Legend, on the Drawings.
- E. Sizes: As indicated in the Materials Legend, on the Drawings.

- F. Acoustical Performance:
 - 1. ACT-01:
 - a. NRC: 0.70 Minimum.
 - b. CAC: 35 minimum.
 - 2. ACT-02:
 - a. NRC: 0.80 Minimum.
 - b. CAC: 35 minimum.
 - 3. ACT-03:
 - a. NRC: 0.80 Minimum.
 - b. CAC: 35 minimum.
 - 4. ACT-04:
 - a. NRC: 0.55 Minimum.
 - b. CAC: 35 minimum.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Cast-in-place or Postinstalled expansion anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - a. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 2.69-mm- (0.106-inch-) diameter wire.
- E. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- F. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

- G. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in place.
- H. Hold-Down Clips: Within 10 feet of exterior doors and where indicated, provide manufacturer's standard hold-down clips spaced 610 mm (24 inches) o.c. on all cross tees.
- I. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
- J. Clean-Room Gasket System: Where indicated, provide manufacturer's standard system, including manufacturer's standard gasket and related adhesives, tapes, seals, and retention clips, designed to seal out foreign material from and maintain positive pressure in clean room.

2.5 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corp.
 - 3. Chicago Metallic Corporation.
 - 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than Z90 (G30) coating designation; with prefinished 24-mm- (15/16-inch-) wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Steel or aluminum cold-rolled sheet.
 - 5. Cap Finish: Painted white.
 - 6. Gasket System: For ACT-4, provide gasketed system, Clean-room type.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System for Wood Ceiling Baffles, Section 06 44 00 "Ornamental Woodwork": Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than Z90 (G30) coating designation; with prefinished 24-mm- (15/16-inch-) wide metal caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Steel or aluminum cold-rolled sheet.
 - 5. Cap Finish: Painted black.
- D. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than Z90

(G30) coating designation; with prefinished 15-mm- (9/16-inch-) wide metal caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
3. Face Design: Flat, flush.
4. Cap Material: Steel or aluminum cold-rolled sheet.
5. Cap Finish: Painted white.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Armstrong World Industries, Inc.
 2. CertainTeed Corp.
 3. Chicago Metallic Corporation.
 4. Fry Reglet Corporation.
 5. Gordon, Inc.
 6. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221M (ASTM B 221) for Alloy and Temper 6063-T5.
 2. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 0.04 mm (1.5 mils). Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.7 ACOUSTICAL SEALANT

- A. Products: Subject to compliance with requirements, provide one of the following:
1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - b. USG Corporation; SHEETROCK Acoustical Sealant.
 - c. PL Acoustical Sealant; Chemrex, Inc., Contech Brands.

- B. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
 - 2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 1200 mm (48 inches) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 200 mm (8 inches) from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
 12. When extending existing acoustical ceiling within a room, match existing grid pattern. Discontinuous grid patterns are prohibited.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 400 mm (16 inches) o.c. and not more than 75 mm (3 inches) from ends, leveling with ceiling suspension system to a tolerance of 3.2 mm in 3.6 m (1/8 inch in 12 feet). Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.

3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Install hold-down and / or impact clips in areas indicated, in areas required by authorities having jurisdiction; space as recommended by panel manufacturer's written instructions unless otherwise indicated.
7. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.

G. Where existing ceilings are present:

1. Rework existing ceiling grid as required to maintain a continuous pattern within each room. Group new and existing tiles into areas for consistency, matching color and texture.
2. Replace damaged, cracked, stained, or missing ceiling tiles throughout the areas of project as needed with tiles to match existing pattern and color.
3. Reseat insulation above existing ceiling tile where disturbed. Leave insulation in continuous plane, tightly butted throughout. Do not cover light fixtures.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
1. Compliance of seismic design.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations show compliance with requirements.
1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
 - a. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 890 N (200 lbf) of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 1957 N (440 lbf) of tension.
 - b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

- D. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 61 00

CONCRETE FLOOR TREATMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section include the following:
 - 1. Sealing of concrete floor areas not scheduled to receive finish floor covering.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 03 30 00 "Cast-in-Place Concrete" for concrete.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership

Extraction Practices. If available, for each product submit documentation of the following:

- 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
- d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
- e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
- 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.

1.3 INFORMATIONAL SUBMITTALS

- A. Informational Submittals: Submit following:
1. Test Reports: For pre-installation substrate moisture and alkalinity tests.
 2. Certifications specified in Quality Assurance article.
 3. Qualification Data: Manufacturer's and applicator's qualification data.
 4. Manufacturer's instructions.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Record Documents: Showing locations of substrate moisture and alkalinity tests. Provide markups on floor plan indicating the location of each test and the dates tests were performed.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum 5 years documented experience.
- B. Applicator Qualifications: Acceptable to manufacturer with documented experience on at least 5 projects of similar nature in past 5 years.
- C. Substrate Moisture and pH Testing:
1. Perform pre-installation testing of the concrete slab by a calcium chloride test, or as otherwise required by flooring manufacturer, prior to the application of flooring products in accordance with ASTM F 1869 – 98.
 2. Perform testing by qualified personnel.
 3. Determine the change in weight of moisture-absorbing anhydrous calcium chloride and represent the amount of moisture transmitting out of the concrete slab area.

4. Express the value in pounds as the equivalent weight of water that is emitted from a 1,000 square foot concrete slab surface area in a 24 hour period of time.
 5. Provide pH testing of substrate.
 6. Provide a diagram of the building verifying each testing location with its results.
 7. Provide 3 tests per 1000 square feet of floor area plus one additional test for each 1000 square feet thereafter. Locate tests in various parts of the floor area including the center of the floor and sites of potential moisture such as the perimeter of the floor, joints, or cracks.
 8. Acceptable Product: Concrete Vapor and pH Testing Kits as manufactured by Vaprecision Testing Systems, 800-449-6194.
- D. Preinstallation Conference: Conduct conference with attendance and participation of the following:
1. Owner.
 2. Architect.
 3. Contractor.
- E. Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to flooring application including, but not limited to, the following.
1. Review methods and procedures related to flooring installation, including manufacturer's written instructions.
 2. Review concrete substrate requirements for conditions affecting performance of flooring, including results of moisture and alkalinity tests.
 3. Review locations and frequency of moisture and alkalinity tests.

1.6 FIELD SAMPLES

- A. General: Comply with Section 01 40 0.
1. Sample Installation:
 - a. Provide field sample with base in area indicated 100 square feet (of 9 m²) of flooring, including 3 feet (900 mm) of base.
 - b. When accepted, field sample will demonstrate minimum standard for Project. Approved field sample may remain as part of Work.

1.7 PRE-INSTALLATION CONFERENCE

- A. Minimum Agenda:
1. Review Project Specifications and Drawings.
 2. Establish acceptable concrete substrate requirements and remedial measures for cracks.
 3. Review installation procedures, including:
 - a. Mixing requirements.
 - b. Thickness and levelness tolerances.
 - c. Finishing requirements.
 - d. Phasing requirements.
 - e. Review inspection, testing, and quality control procedures.
 - f. Review protection requirements for construction period beyond flooring installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manner to prevent damage to containers and bags.
- B. Store materials in accordance with manufacturer's instructions in clean and dry location with temperature between 60 F and 90 F (16 C and 32 C).

1.9 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Do not install concrete floor treatments until slabs have cured and are sufficiently dry, as determined by concrete floor treatment manufacturer's recommendations, and field moisture and alkalinity tests.
 - 2. Do not install flooring when slab temperature is below 55 F (13 C) or above 90 F (32 C).
 - 3. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of flooring.
 - 4. Ventilate area where flooring is being installed.
 - 5. Indoor Air Quality Procedures: Ventilate in accordance with Section 01 81 13 Sustainable Design Requirements.

PART 2 - PRODUCTS

2.1 GENERAL

- A. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide indicated products with manufacturer's product-specific Health Product Declarations (HPDs).

2.2 CONCRETE SEALING

- A. Hardening/Dustproofing/Sealing [**CF2**]:
 - 1. Water-based, colorless, odorless solution of specialized reactive chemicals which penetrates concrete surfaces to seal, densify and harden.
 - 2. Basis of Design Manufacturer/Product: Subject to compliance with the requirements, provide Prosoco; Consolideck® LS/CS® or a comparable product by another manufacturer, acceptable to the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions prior to beginning Work.
 - 1. Examine areas to receive concrete floor treatment for:
 - a. Defects in substrate that may affect proper execution of flooring work.
 - b. Deviations beyond allowable tolerance for concrete slab work.

- c. Surface curing agents or sealers that would inhibit penetration.
 - d. Surface defects such as cracks that could transfer through to finished flooring surface if not corrected.
 2. Do not begin floor treatment work until concrete substrate has cured 28 days, minimum.
 3. Do not begin work until unsatisfactory conditions have been corrected.
- B. Concrete Floors: Verify that concrete slabs comply with ASTM F 710 and the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing substrate moisture and alkalinity tests.

3.2 PREINSTALLATION TESTING

- A. General: Perform preinstallation testing.
- B. Submit copies of test reports and concrete floor treatment manufacturer's written acceptance of substrate conditions to Owner and Architect prior to flooring installation.
- C. If test results indicate concrete subfloor is not within flooring manufacturers' acceptable range, notify Owner and Architect.

3.3 PREPARATION

- A. Prepare Substrate: Tests concrete substrate for pH, contaminants, and moisture content in accordance with manufacturer's recommendations. Ensure concrete is within manufacturers recommended limits prior to installation.
- B. Concrete Sub-floors: Verify that concrete slabs comply with the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with penetration.
 2. Mechanically abrade or shot-blast concrete flooring to remove inappropriate curing agents and to open pores of concrete surfaces to allow penetration of treatment agent. Completely remove cleaning residue. Acid washing is not acceptable.
 3. Repair cracks, divots and surface imperfections according to manufacturer's instructions.
 4. Vacuum to remove dust and debris.

3.4 APPLICATION

- A. General: Apply concrete floor treatment according to manufacturer's instructions.
 1. Provide uniform monolithic wearing surface uninterrupted except where indicated or required.
- B. Joint Sealants: Where substrate is interrupted by expansion or control joints, provide joint in floor to comply with details indicated or as recommended by flooring manufacturer and section 07 92 00 Joint Sealants.

3.5 CURING

- A. Cure flooring materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process.
 - 1. Indoor Air Quality Procedures: Ventilate in accordance with Section 01 81 13 Sustainable Design Requirements.

3.6 CLEANING

- A. Clean as recommended by manufacturer. Do not use materials or methods which may damage surface or surrounding construction.
 - 1. Remove temporary covering and clean flooring prior to final inspection. Use cleaning materials and procedures recommended by flooring manufacturer.
 - 2. Do not permit traffic over finished flooring surfaces.

3.7 PROTECTION

- A. Protect flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application.

END OF SECTION

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient stair accessories.
 - 3. Resilient molding accessories.

- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 09 Section "Static-Control Resilient Flooring" for resilient floor coverings designed to control electrostatic discharge.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.

- b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 300 mm (12 inches) long, of each resilient product color, texture, and pattern required.
- D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.
- B. Source Limitations: Obtain each type and color of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- C. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
 - 2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups for base and for stair accessories.
 - a. Size:
 - 1) Minimum 10 lf. for each type, color and pattern of base, including interior and exterior corner, in locations directed by Architect.
 - 2) Three stair treads with riser.
 - 2. Provide resilient base for flooring mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - a. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring resilient flooring.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Mockups: Provide resilient products with mockups specified in other Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10 deg C (50 deg F) or more than 32 deg C (90 deg F).
- C. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.5 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C (70 deg F) or more than 35 deg C (95 deg F), in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13 deg C (55 deg F) or more than 35 deg C (95 deg F).
- C. Install resilient products after other finishing operations, including painting, have been completed.
- D. For resilient products installed on traffic surfaces, close spaces to traffic during installation and for time period after installation recommended in writing by manufacturer.

1.6 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 3 linear m (10 linear feet) for every 150 linear m (500 linear feet) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 GENERAL

- A. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide resilient base and accessory products that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 3. LEED Requirements: Provide resilient base and accessory products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
 - 4. LEED Requirements: Provide resilient base and accessory products with Cradle to Cradle certification, at minimum version 2 Basic level or version 3 Bronze level.

2.2 RESILIENT BASE

- A. FloorScore Compliance: Resilient base shall comply with requirements of FloorScore Standard.
- B. Resilient Base [**RB-01**]:
 - 1. Manufacturers: Subject to compliance with requirements, provide products indicated in the Material Legend, on the Drawings.
- C. Resilient Base Standard: ASTM F 1861.
 - 1. Material Requirement: Type TS (rubber, vulcanized thermoset).
 - 2. Manufacturing Method: Group I (solid, homogeneous).
 - 3. Style:
 - a. Cove (base with toe) at floors, unless otherwise indicated.
 - b. Straight (flat or toeless) at floors with carpet finish.
 - 4. Minimum Thickness: 3.2 mm (0.125 inch).
 - 5. Height: 6 inches, unless otherwise indicated.
 - 6. Lengths: Coils in manufacturer's standard length.
 - 7. Outside Corners: Preformed.
 - 8. Inside Corners: Job formed or preformed.
 - 9. Finish: Matte.
 - 10. Colors and Patterns: As indicated in the Materials Legend, on the Drawings.

2.3 RESILIENT STAIR ACCESSORIES

- A. FloorScore Compliance: Resilient stair treads shall comply with requirements of FloorScore Standard.
- B. Resilient Stair Treads [**RF-05**]:
 - 1. Product: Subject to compliance with requirements, provide product indicated in the Materials Legend, on the Drawings.
- C. Resilient Stair Treads Standard: ASTM F 2169.
 - 1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
 - 2. Surface Design:
 - a. Class 1, Hammered.
 - 3. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
 - 4. Nosing Height: 4.5 cm.
 - 5. Thickness: 1/4 inch (6 mm) and tapered to back edge.
 - 6. Size: Lengths and depths to fit each stair tread and riser in one piece.
 - a. Risers: Smooth, flat, continuous with tread;
 - 7. Colors and Patterns: As indicated.
 - 8. Landing Tile: Hammered surface and color to match stair treads.
 - 9. Adhesives:
 - a. Step Fix Roll Adhesive.
 - b. #410 acrylic adhesive.

2.4 RESILIENT MOLDING ACCESSORY

- A. FloorScore Compliance: Resilient molding accessories shall comply with requirements of FloorScore Standard.
- B. Resilient Molding Accessory:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - b. Flexco, Inc.
 - c. Johnsonite.
 - d. R.C.A. Rubber Company (The).
 - e. Roppe Corporation, USA.
 - f. VPI, LLC; Floor Products Division.
- C. Types:
 - 1. Reducer strip for resilient floor covering.
 - 2. Transition strips.
- D. Material: Rubber.
- E. Profile and Dimensions: Unless otherwise indicated, products listed below are those of Johnsonite and are listed as a minimum standard of quality.
 - 1. Resilient Tile-to-Sheet Vinyl: RRS-XX-D.
 - 2. Resilient Tile-to-Concrete: RRS-XX-D.
 - 3. Tile Carpeting-to-Concrete: CRS-XX-A

- F. Colors and Patterns: As indicated in the Interior Finish Legend on the Drawings.

2.5 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Sealant: Silicone sealant acceptable to resilient base and sheet vinyl flooring manufacturers. Refer to Section 07 92 00, color match sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

- D. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 - 1. Inside Corners: Use straight pieces of maximum lengths possible.
- H. Preformed Corners: Install preformed corners before installing straight pieces

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 - 2. Tightly adhere treads and risers to substrates throughout length of each piece with Roll Adhesive.
 - 3. Tightly adhere landing tiles to substrates with acrylic adhesive.
 - 4. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of resilient floor covering that would otherwise be exposed.
- D. Sealant (in wet areas, and where indicated): Apply sealant to seal joint between resilient base and sheet vinyl flooring. Comply with base, flooring, and sealant manufacturers' published instructions.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Do not wash resilient products until after time period recommended by resilient product manufacturer.
 - 4. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended in writing by resilient product manufacturer.
- D. Clean resilient products not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.

END OF SECTION

SECTION 09 65 16

RESILIENT SHEET AND TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rubber sheet floor covering.
 - 2. Rubber tile floor covering.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 4. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.

- b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For each type of floor covering. Include floor covering layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
- 1. Show details of special patterns.
- D. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch sections of each different color and pattern of floor covering required.
- E. Seam Samples: For seamless-installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- 1. Chemical welded seam.
- F. Product Schedule: For floor coverings. Use same designations indicated on Drawings.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For qualified Installer.
 - B. Report of field testing of concrete substrates.
 - C. Maintenance Data: For each type of floor covering to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor covering manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups for floor coverings, wall coverings, including base and accessories.
 - a. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color and pattern in locations directed by Architect.
 - 2. Provide resilient flooring for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - a. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring resilient flooring.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 WARRANTY

- A. Provide manufacturer's standard warranty against defects in manufacturing and workmanship of resilient flooring products. Provide manufacturer's warranty as specified under each product as applicable, including 5 year limited wear.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store rolls upright.

1.7 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 85 deg F (29 deg C), in spaces to receive floor coverings during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install floor coverings after other finishing operations, including painting, have been completed.

1.8 MAINTENANCE MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Covering: Furnish quantity not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, in roll form and in full roll width for each color, pattern, and type of floor covering installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Impact Insulation Class (ASTM E492): meet IIC50, impact insulation class, without an acoustical underlayment with a 9-inch thick concrete slab and no ceiling below.
- C. LEED Performance Requirements
 - 1. For interior, wet-applied, field installed adhesives, sealants, paints, bonding chemicals and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 2. Provide resilient sheet flooring products and accessories that meet emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 - 3. Provide resilient sheet flooring products with Greenguard Gold Certification.
 - 4. Provide resilient sheet flooring products with manufacturer's product-specific Health Product Declarations (HPDs).
 - 5. FloorScore Compliance: Sheet Rubber Floor Covering shall comply with requirements of FloorScore Standard.

2.2 RUBBER SHEET FLOOR COVERING

- A. Manufacturer: Subject to compliance with the requirements, provide manufacturer indicated in the Materials Legend, on the Drawings.
- B. Products: As indicated in the Materials Legend, on the Drawings.

- C. Unbacked Homogeneous Rubber Sheet Floor Covering [**RF-01**], [**RF-02**], [**RF-06**], [**RF-07**]: ASTM F 1859.
 - 1. Thickness: 3 mm.
- D. Unbacked Homogeneous Rubber Tile Floor Covering [**RF-3**]: ASTM F 1344.
 - 1. Thickness: 3 mm.
- E. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer per ASTM D 2240.
- F. Wearing Surface: Smooth.
- G. Sheet Width: As standard with manufacturer.
- H. Size of tile: As standard with manufacturer.
- I. Seaming Method:
 - 1. Chemical Welded.
- J. Colors and Patterns:
 - 1. As indicated in the Materials Legend, on the Drawings.
- K. Integral-Flash-Cove-Base: Color and pattern same as adjacent rubber flooring sheet.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
- C. Seamless-Installation Accessories:
 - 1. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.
 - 2. Chemical-Bonding Compound shall have a VOC content of 510 g/L or less.
 - 3. Chemical-Bonding Compound shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
- D. Integral-Flash-Cove-Base Accessories:
 - 1. Cove Strip: 1-inch (25-mm) radius provided or approved by manufacturer.
 - 2. Cap Strip: Square aluminum cap provided or approved by manufacturer.
 - a. Finish: Clear anodized.
 - 3. Corners: Miter and weld inside and outside corners.

- E. Metal Edge Protection: Roll-formed Type 304 stainless steel, height as required to accept scheduled flooring thickness.
 - 1. Product: As indicated on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor coverings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - 5. Prepare testing report.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor coverings until they are same temperature as space where they are to be installed.
 - 1. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

- E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

3.3 FLOOR COVERING INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor coverings.
- B. Unroll floor coverings and allow them to stabilize before cutting and fitting.
- C. Lay out sheet floor coverings as follows:
 - 1. Maintain uniformity of floor covering direction.
 - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches (152 mm) away from parallel joints in floor covering substrates.
 - 3. Match edges of floor coverings for color shading at seams.
 - 4. Avoid cross seams.
- D. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis in pattern indicated.
- E. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in pattern of colors and sizes indicated.
- F. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.
- G. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- H. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.
- I. Install floor coverings on covers for telephone and electrical ducts, expansion joint covers and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of floor coverings installed on covers and adjoining floor covering. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.
- J. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- K. Seamless Installation:
 - 1. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams

and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

- L. Integral-Flash-Cove Base: Cove floor coverings 6 inches up vertical surfaces unless otherwise indicated. Support floor coverings at horizontal and vertical junction by cove strip. Butt at top against cap strip.
 - 1. Install butterfly corners at outside corners.
 - 2. Weld corners at inside and outside corners.

3.4 WALL COVERING INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor coverings on walls.
- B. Unroll floor coverings and allow them to stabilize before cutting and fitting.
- C. Lay out floor coverings as follows:
 - 1. Maintain uniformity of floor covering direction.
 - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches (152 mm) away from parallel joints in floor covering substrates.
 - 3. Match edges of floor coverings for color shading at seams.
 - 4. Avoid cross seams.
- D. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.
- E. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- F. Seamless Installation:
 - 1. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.
- B. Perform the following operations immediately after completing floor covering installation:
 - 1. Remove adhesive and other blemishes from floor covering surfaces.
 - 2. Sweep and vacuum floor coverings thoroughly.
 - 3. Damp-mop floor coverings to remove marks and soil.

- C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor coverings until Substantial Completion.

END OF SECTION

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SECTION 09 65 36

STATIC-CONTROL RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Static-dissipative, rubber floor tile.

B. Sustainable Design Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 09 65 13 "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with static-control resilient flooring.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to static-control resilient flooring including, but not limited to, the following:
 - a. Examination and preparation of substrates to receive static-control resilient flooring.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - C. Shop Drawings: For each type of static-control resilient flooring. Include floor-covering layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 1. Show details of special patterns.
 2. Show locations of inscribed maintenance tiles.
 3. Submit grounding diagram showing location of grounding strips and connections.
 - D. Samples for Verification: For each type of static-control resilient flooring, of size indicated below:
 1. Floor Tile: Full-size units.
 - E. Product Schedule: For static-control resilient flooring. Use same designations indicated on Drawings.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for static-control resilient flooring.

- C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of static-control resilient flooring to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for static-control resilient flooring.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups for static-control resilient flooring including resilient base and accessories.
 - a. Size: Minimum **100 sq. ft. (9.3 sq. m)** for each type, color, and pattern in locations directed by Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store static-control resilient flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer but not less than **50 deg F (10 deg C)** or more than **90 deg F (32 deg C)**.
 - 1. Floor Tile: Store on flat surfaces.

1.9 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than **70 deg F (21 deg C)** or more than **85 deg F (29 deg C)**, in spaces to receive static-control resilient flooring during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Close spaces to traffic during static-control resilient flooring installation.
- C. Close spaces to traffic for 48 hours after static-control resilient flooring installation.

- D. Install static-control resilient flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Static-Dissipative Properties: Provide static-control resilient flooring with static-control properties indicated as determined by testing identical products per test method indicated by an independent testing and inspecting agency.
 - 1. Electrical Resistance: Test per ASTM F 150: $10^6 < 10^9$ (ohms) when installed floor coverings are tested surface to ground.
 - 2. Static Generation: ANSI ESD S97.2, < 20 Volts.
 - 3. Static Decay: FTM 101 C 4046, < 0.25, (sec).
- B. LEED Performance requirements: Provide static dissipative resilient sheet flooring products with Greenguard Gold Certification.
- C. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 STATIC-DISSIPATIVE RESILIENT FLOOR COVERINGS

- A. Static-Dissipative Rubber Floor Tile [**RF-04**]: ASTM F 1344; except in manufacturer's standard hardness when tested per ASTM D 2240 using Shore, Type A durometer.
 - 1. Smooth-Surface Floor Tile: Class I-B (homogenous rubber, through-mottled pattern).
 - a. Manufacturer: Subject to compliance with requirements, provide products indicated in the Materials Legend, on the Drawings, or comparable products by one of the following:
 - 1) Nora Systems, Inc.
 - 2) PRF USA Inc.
 - b. Thickness: 3 mm.
 - c. Size: 39.37 inches (1 m) by 39.37 inches (1m).
 - d. Seaming Method: Standard.
 - e. Colors and Patterns: As indicated in the Materials Legend, on the Drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified portland cement or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

- B. Static-Control Adhesive: Provided or approved by manufacturer; type that maintains electrical continuity of floor-covering system to ground connection.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Grounding Strips: Provided or approved by manufacturer; type and size that maintains electrical continuity of floor-covering system to ground connection.
- D. Maintenance Floor Tiles: Special floor tiles inscribed "Conductive floor. Do not wax."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer and manufacturer's representative present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion or static-control characteristics of floor coverings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions and with oversight by manufacturer's representative to ensure adhesion of static-control resilient flooring and electrical continuity of floor-covering systems.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with floor-covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m)** in 24 hours.
 - b. Perform relative-humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative-humidity level measurement.

- C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.
- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- E. Do not install static-control resilient flooring until it is same temperature as space where it is to be installed.
 - 1. Move static-control resilient flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- F. Sweep and vacuum substrates to be covered by static-control resilient flooring immediately before installation.

3.3 INSTALLATION, GENERAL

- A. Install static-control resilient flooring according to manufacturer's written instructions and with oversight by manufacturer's representative.
- B. Embed grounding strips in static-control adhesive. Extend grounding strips beyond perimeter of static-control resilient floor-covering surfaces to ground connections.
- C. Scribe, cut, and fit static-control resilient flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- D. Extend static-control resilient flooring into toe spaces, door reveals, closets, and similar openings. Extend static-control resilient flooring to center of door openings.
- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on static-control resilient flooring as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- F. Install static-control resilient flooring on covers for telephone and electrical ducts, and similar items in installation areas. Maintain overall continuity of color and pattern with pieces of static-control resilient flooring installed on covers. Tightly adhere static-control resilient flooring edges to substrates that abut covers and to cover perimeters.
- G. Adhere static-control resilient flooring to substrates using a full spread of static-control adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 FLOOR-TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as

necessary to avoid using cut widths that equal less than one-half floor tile at perimeter.

1. Lay floor tiles square with room axis, unless otherwise indicated.

- C. Match floor tiles for color and pattern by selecting floor tiles from cartons in same sequence as manufactured and packaged if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.
- D. In each space where conductive, rubber floor tile is installed, install maintenance floor tile identifying conductive floor tile in locations approved by Architect.

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified testing agency to test electrical resistance of static-control resilient flooring for compliance with requirements.
 - 1. Arrange for testing after static-control adhesives have fully cured and static-control resilient flooring has stabilized to ambient conditions and after ground connections are completed.
- B. Static-control resilient flooring will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of static-control resilient flooring.
- B. Perform the following operations immediately after completing static-control resilient flooring:
 - 1. Remove static-control adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect static-control resilient flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
 - 1. Do not wax static-control resilient flooring.
 - 2. If recommended in writing by manufacturer, apply protective static-control floor polish formulated to maintain or enhance floor covering's electrical properties; ensure static-control resilient flooring surfaces are free from soil, static-control adhesive, and surface blemishes.
 - a. Verify that both floor polish and its application method are approved by manufacturer and that floor polish will not leave an insulating film that reduces static-control resilient flooring's effectiveness for static control.
 - 3. Cover static-control resilient flooring until Substantial Completion.

END OF SECTION

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SECTION 09 72 00

WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fabric wall covering.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Division 09 Section "Interior Painting" for priming wall surfaces.
4. Division 10 Section "Visual Display Fabrics" for visual display fabric wall coverings.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.

- b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Furniture. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement, seams and termination points.
- D. Samples for Verification: Full width by 36-inch- (914-mm-) long section of wall covering.
 - 1. Sample from same print run or dye lot to be used for the Work, with specified applied. Mark top and face of fabric.
 - 2. Sample from same flitch to be used for the Work, with specified finish applied.
- E. Product Schedule: For wall coverings. Use same designations indicated on Drawings.
- F. Qualification Data: For qualified testing agency.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for wall covering.
- H. Maintenance Data: For wall coverings to include in maintenance manuals.
- 1.3 QUALITY ASSURANCE
- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: As follows, per ASTM E 84:
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 2. Fire-Growth Contribution: Textile wall coverings tested according to NFPA 265 or NFPA 286 and complying with test protocol and criteria in the 2003 IBC.
- B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockups for each type of wall covering on each substrate required. 100 sq. ft. minimum size. Comply with requirements in ASTM F 1141.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.4 PROJECT CONDITIONS
- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
1. Wood-Veneer Wall Coverings: Condition spaces for not less than 48 hours before installation.
- B. Lighting: Do not install wall covering until a permanent level of lighting is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.
- 1.5 EXTRA MATERIALS
- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Wall-Covering Materials: For each type, full-size units equal to 5 percent of amount installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Low-Emitting Materials: Wall-covering system shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- B. LEED Requirements: Provide wall covering products with Cradle to Cradle certification, at minimum version 2 Basic level or version 3 Bronze level.
- C. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

2.2 WALL COVERINGS

- A. General: Provide rolls of each type of wall covering from same print run or dye lot.

2.3 FABRIC WALL COVERING

- A. Fabric Wall-Coverings [**WC-1**]: Provide mildew-resistant products:
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Material as indicated in the Materials Legend, on the Drawings.
 - 2. Backing: As recommended by fabric wall covering manufacturer.

2.4 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application; as recommended in writing by wall-covering manufacturer
- B. Primer/Sealer: Mildew resistant, complying with requirements in Division 09 Section "Interior Painting" and recommended in writing by wall-covering manufacturer for intended substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.

- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 - 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 3. Metals: If not factory primed, clean and apply metal as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 4. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 5. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.
- G. Install wall liner, with no gaps or overlaps, where required by wall-covering manufacturer. Form smooth wrinkle-free surface for finished installation. Do not begin wall-covering installation until wall liner has dried.

3.3 INSTALLATION

- A. General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated except where more stringent requirements apply.
- B. Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
- D. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.
- E. Install seams vertical and plumb at least 6 inches (150 mm) from outside corners and 3 inches (75 mm) from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.
- F. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

3.4 CLEANING

- A. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION

SECTION 09 75 23

SOLID-SURFACING WALL FACING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes solid-surfacing paneling on interior walls.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 ACTION SUBMITTALS

- A. Product Data: For each variety of solid-surfacing, solid-surfacing accessory, and manufactured product.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership

Extraction Practices. If available, for each product submit documentation of the following:

- 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
- d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
- e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
- 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Show fabrication and installation details for solid-surfacing paneling system, including dimensions and profiles of solid-surfacing units.
1. Show locations and details of joints both within solid-surfacing paneling system and between solid-surfacing paneling system and other finish materials.
 2. Show direction of veining, grain, or other directional pattern.
- D. Samples for Verification:
1. For each solid-surfacing type indicated. Samples shall show the full range of variations in appearance characteristics in completed Work.
 2. For each color of sealant required.

1.3 INFORMATIONAL SUBMITTALS

- A. Material Test Reports:
1. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer indicating that sealants will not stain or damage solid-surfacing. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.
- B. Qualification Data: for Fabricator and installer.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid-surfacing paneling to include in maintenance manuals. Include product data for solid-surfacing-care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Shop is a certified participant in AWI's Quality Certification Program.
 - 2. Shop or individual is certified, licensed, or otherwise qualified by solid-surfacing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements
- B. Installer Qualifications: Fabricator of products.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Sealant Adhesion and Compatibility Testing: Submit to joint-sealant manufacturers, for compatibility and adhesion testing according to sealant manufacturer's standard testing methods and Section 07 92 00 "Joint Sealants," Samples of materials that will contact or affect joint sealants.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle solid-surfacing and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, and other causes.
 - 1. Store components indoors prior to installation.
 - 2. Handle materials to prevent damage to finished surfaces.
 - a. Provide protective coverings to prevent physical damage or staining following installation for duration of project.
- B. Mark solid-surfacing units, on surface that will be concealed after installation, with designations used on Shop Drawings to identify individual solid-surfacing units. Orient markings on vertical panels so that they are right side up when units are installed.
- C. Deliver sealants to Project site in original unopened containers labeled with manufacturer's name, product name and designation, color, expiration period, pot life, curing time, and mixing instructions for multicomponent materials.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install solid surfacing paneling until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Field Measurements: Verify dimensions of construction to receive solid-surfacing paneling by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 COORDINATION

- A. Time delivery and installation of solid-surfacing paneling to avoid extended on-site storage and to coordinate with work adjacent to solid-surfacing paneling.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. LEED Performance requirements:
 - 1. Provide solid-surfacing products with manufacturer's product-specific Health Product Declarations (HPDs).
 - 2. Low-Emitting Materials: Wall-covering system shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke developed: 450 or less.

2.2 MANUFACTURERS

- A. Solid Surface Material [**SSM-03**]: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.
 - 1. Manufacturer: Subject to compliance with requirements, provide products by the following:
 - a. Avonite Surfaces.
 - b. E. I. du Pont de Nemours and Company.
 - c. LivingStone Surfaces.
 - d. Samsung Chemical USA, Inc.
 - e. Wilsonart International.
 - 2. Type: Provide Standard Type unless Special Purpose Type is indicated.
 - 3. Thickness: 1/4 inch, unless otherwise indicated.
 - 4. Edge treatment: As indicated.
 - 5. Colors and Patterns: As indicated in the Materials Legend, on the Drawings.

2.3 ADHESIVES

- A. Panel adhesive:
 - 1. Manufacturer recommended 100% silicone sealant.

2.4 SEALANTS

- A. Joint Sealants: Manufacturer's standard sealants that comply with applicable requirements in Section 07 92 00 "Joint Sealants" and will not stain the solid-surfacing they are applied to.
 - 1. Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.
 - 2. Colors: Provide colors of exposed sealants to match other joints in solid-surfacing adjoining sealed joints unless otherwise indicated.

2.5 SOLID-SURFACING ACCESSORIES

- A. Temporary Setting Shims: Rigid plastic shims, nonstaining to solid-surfacing, sized to suit joint thickness.
- B. Cleaner: Solid-surfacing cleaner specifically formulated for solid-surfacing types, finishes, and applications indicated, as recommended by solid-surfacing producer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.

2.6 SOLID-SURFACING FABRICATION, GENERAL

- A. Fabricate solid-surfacing paneling according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Premium.
- B. Finish exposed faces and edges of solid-surfacing to comply with requirements indicated for finish of each solid-surfacing type required and to match approved Samples and mockups.
- C. Carefully inspect finished solid-surfacing units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

2.7 SOLID-SURFACING PANELING ON WALLS

- A. Nominal Thickness: 1/4 inch unless otherwise indicated.
- B. Substrate for applications: See Section 09 29 00 Gypsum Board for substrate materials.
 - 1. Dry applications: Glass-Mat Interior Gypsum Board.
 - 2. Toilet Room interior exposed wall applications: Glass-Mat, Water-Resistant Backing Board.
 - 3. Shower and toilet room exterior exposed wall applications: Cementitious Backer Units.
 - a. Waterproofing membrane — See Section 09 30 13 Ceramic Tiling.
- C. Pattern Arrangement: Fabricate and arrange panels with veining and other natural markings to comply with the following requirements:

1. As indicated on the Drawings, or is not indicated, as approved by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive solid-surfacing paneling and conditions under which solid-surfacing paneling will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of solid-surfacing paneling.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of solid-surfacing paneling.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING SOLID-SURFACING, WALL FACING GENERAL

- A. Before setting solid-surfacing, clean surfaces that are dirty or stained by removing soil, stains, and foreign materials. Clean solid-surfacing by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
- B. Do necessary field cutting as solid-surfacing is set. Use power saws with blades recommended by the solid-surfacing manufacturer to cut solid-surfacing. Cut lines straight and true, with edges eased slightly to prevent snipping. Finish cut edges the same as shop fabricated edges.
- C. Contiguous Work: Provide reveals and openings as required to accommodate contiguous work.
- D. Erect solid-surfacing units level, plumb, and true with uniform joint widths. Use temporary shims to maintain joint width.
- E. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.
 1. Sealing of expansion and other joints is specified in Section 07 92 00 "Joint Sealants."
 2. Keep expansion joints free of adhesive, and other rigid materials.

3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed **1/8 inch in 96 inches (3 mm in 2400 mm)**, **1/4 inch (6 mm)** maximum.
- B. Variation from Level: For lintels, sills, chair rails, horizontal bands, horizontal grooves, and other conspicuous lines, do not exceed **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, **3/8 inch (10 mm)** maximum.

- C. Variation of Linear Building Line: For position shown in plan and related portion of walls and partitions, do not exceed **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, **3/8 inch (10 mm)** maximum.
- D. Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions indicated, do not exceed plus or minus **1/8 inch (3 mm)**.
- E. Variation in Joint Width: Do not vary from average joint width more than plus or minus **1/16 inch (1.5 mm)** or one-fourth of nominal joint width, whichever is less.
- F. Variation in Plane between Adjacent Solid-surfacing Units (Lipping): Do not exceed **1/32-inch (0.8-mm)** difference between planes of adjacent units.

3.4 INSTALLATION OF SOLID-SURFACING WALL FACING

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
 - 1. Exposed joints/seams shall not be allowed.
 - 2. Cut and finish component edges with clean, sharp returns.
 - 3. Carefully dress joints smooth, remove surface scratches and clean entire surface.

3.5 JOINT-SEALANT INSTALLATION

- A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Section 07 92 00 "Joint Sealants." Remove temporary shims before applying sealants.

3.6 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean solid-surfacing paneling as work progresses. Remove adhesive, and sealant smears immediately.
- B. Remove and replace solid-surfacing paneling of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged solid-surfacing. Solid-surfacing may be repaired if methods and results are approved by Architect.
 - 2. Defective solid-surfacing paneling.
 - 3. Defective joints, including misaligned joints.
 - 4. Solid-surfacing paneling and joints not matching approved Samples and mockups.
 - 5. Solid-surfacing paneling not complying with other requirements indicated.
- C. Replace in a manner that results in solid-surfacing paneling that matches approved Samples and mockups, complies with other requirements, and shows no evidence of replacement.
- D. Clean solid-surfacing paneling, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage solid-surfacing.
- E. PROTECTION

- F. Protect solid-surfacing surfaces, edges, and corners from construction damage. Use securely fastened untreated wood, plywood, or heavy cardboard to prevent damage.
- G. Before inspection for Substantial Completion, remove protective coverings and clean surfaces.

END OF SECTION

SECTION 09 77 13

STRETCHED-FABRIC SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the following:
 - 1. Site-upholstered wall systems.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 DEFINITIONS

- A. NRC: Noise reduction coefficient.
- B. SAA: Sound absorption average.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for stretched-fabric systems.
 - 2. Include furnished specialties and accessories.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Composite Wood Products.
 - 4) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For each stretched-fabric system. Include installation and system details; details at head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate frame edge and core materials.
 1. Include elevations showing panel sizes and direction of fabric weave and pattern matching.
 2. Include reflected ceiling plans showing panel sizes and direction of fabric weave.
- D. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 1. Electrical outlets, switches, and thermostats.
 2. Items penetrating or covered by stretched-fabric systems including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Alarms.
 - e. Sprinklers.
 - f. Access panels.

- E. Samples for Verification: For the following products prepared on Samples of size indicated below.
 - 1. Fabric: Full-width by approximately 36-inch- (900-mm-) long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
 - 2. Frame System: 12-inch- (300-mm-) square Sample(s) showing each edge profile and corner.
 - 3. Core Material: 12-inch- (300-mm-) square Sample at corner.
- F. Mockups: Build mockups to verify selections and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. To set quality standards for installation, provide 4 foot long, by full height mockup, including corner condition, include seam if allowed.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of stretched-fabric system.
- C. Sample Warranty: For special warranty.
- D. Maintenance Data: For stretched-fabric systems to include in maintenance manuals. Include fabric manufacturer's written cleaning, stain-removal, restretching, and reupholstering recommendations.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who employs workers trained and approved by stretched fabric system manufacturer to install manufacturer's products.
 - 1. Manufacturer's authorized representative who is trained and approved for installation of systems required for this Project.
- B. Product Options: Products and manufacturers named in Part 2 establish requirements for product quality in terms of appearance, construction, and performance. Other manufacturers' products comparable in quality to named products and complying with requirements may be considered. Refer to Division 01 Section "Substitution Procedures."
- C. Source Limitations: Obtain stretched-fabric systems from single source from single manufacturer.

- D. Fire-Test-Response Characteristics: Provide stretched-fabric systems meeting the following requirements as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 26 to 75.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265.
- E. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and stretched-fabric system manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.
- C. Comply with fabric manufacturer's written instructions for minimum and maximum temperature and humidity requirements for storage.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install stretched-fabric systems until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install stretched-fabric systems until a permanent level of lighting is provided on surfaces to receive stretched-fabric systems.
- C. Air-Quality Limitations: Protect stretched-fabric systems from exposure to airborne odors such as tobacco smoke, and install systems under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify dimensions by field measurements prior to installation.

1.8 SEQUENCING, SCHEDULING, AND COORDINATION

- A. Consult with other trades in advance and make provisions for their work to avoid cutting and patching.
- B. Notify responsible trades of schedules so as to allow adequate time for installation and coordination of their work.

1.9 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Manufacturer and Installer agree to repair or replace components of stretched-fabric systems that fail in performance, materials, or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Acoustical performance.
 - b. Fabric sagging, distorting, or releasing from panel edge.
 - c. Warping of core.
 - 2. Warranty Period: Five years from date of Substantial Completion.

1.10 EXTRA MATERIALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fabric: For each fabric, color, and pattern installed, furnish length equal to 10 percent of amount installed, but no fewer than 10 yards (9 m).
 - 2. Framing and Related Installation Items: Furnish manufacturer's full-length units equal to 5 percent of amount installed, but no fewer than 5 units, including unopened adhesives.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Fabritrak, or comparable product by one of the following:
 - 1. Fabritrak.
 - 2. Stretchwall
 - 3. Novawall Systems, Inc.
 - 4. Whisper Walls.

2.2 STRETCHED-FABRIC WALL SYSTEMS

- A. SFW, Stretched-Fabric Wall System [**FP-01 - FP-05**]: Manufacturer's standard system consisting of facing material stretched taught over a frame and core material and secured in the frame.
 - 1. Basis-of-Design Product: Fabritrak.
 - 2. Core: Acoustical fill.
 - 3. Frame System: Extruded plastic polymer; designed to friction fit and hold fabric in place by tucking fabric into a slot in a profiled track.
 - a. Nominal Frame Thickness: As indicated on the Drawings.
 - 4. Edge Detail: Square.

5. Frame-Edge: Square profile.
6. Frame Color: Natural.
7. Reveals between Panels: Butted with no reveal.
8. Fabric: Flame retardant, porous, equivalent to Guilford FR-701.
 - a. As indicated in the Materials Legend, on the Drawings.
9. Duvetyn: Flame retardant, porous (8 oz./yd.), supplied by Rosebrand.
 - a. Provide when recommended by facing fabric manufacturer.
10. Nominal Overall System Thickness: As indicated on the Drawings.

2.3 MATERIALS

- A. Acoustic Fill: Made with binder containing no urea formaldehyde.
 1. Polyester board:
 - a. Material: 100% polyester.
 - b. Density: 12 lb / cu ft
 - c. Flammability: ASTM E-84 Class 1 or A.
 - d. Thickness: 9 mm.
 - e. Average NRC 0.35 minimum (no air gap).
- B. Frame-Edge Construction: Manufacturer's standard extruded plastic frame.
- C. Facing Material: Fabric from same dye lot; As indicated in the Materials legend, on the Drawings.

2.4 INSTALLATION MATERIALS

- A. Installation Products, General: Concealed on back of system, recommended by stretched-fabric system manufacturer to support weight of system, fabric tension, and as follows:
- B. Wood and Plywood Furring: Manufacturer's standard plywood or clear, vertical grain, straight, kiln-dried hardwood.
 1. Fire-retardant treated by pressure process with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 2. Treated material shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity.
 3. Kiln-dry material after treatment to 7 to 13 percent or less for lumber and 15 percent or less for plywood.
- C. Damping compound: Provide visco-elastic vibration damping compound in liquid form for spray application. Damping compound shall be non-toxic, non-flammable, water-based emulsion suitable for covering metal surfaces.
 1. Products:
 - a. Soundcoat Company GP-1, Irvine, CA.
 - b. Blachford, Inc. Aquaplas DL-10, Chicago, IL.
 - c. Kinetics Noise Control KDC-E-162, Dublin, OH.
- D. Adhesives: As recommended by stretched-fabric system manufacturer.

1. Low-Emitting Materials: Wall-covering system adhesives shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Fasteners: Manufacturer's standard.

2.5 FABRICATION

- A. Provide complete, continuous frame system with perimeter edge, midspan, and inside and outside corner track units of profile indicated, designed to be inconspicuous when concealed by fabric, with smooth edges and surface finish that will not telegraph through fabric facing.
- B. Fabric Seams: Not allowed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, materials, substrates, areas, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of stretched-fabric systems.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each area and establish layout of panels and joints of sizes indicated on Drawings within a given area.
- B. Before installation, allow fabric to adjust and become stable in spaces where it will be installed in accordance with stretched-fabric system manufacturer's written instructions. Acclimatize fabric for minimum of 24 hours at ambient temperature and humidity conditions indicated for spaces when occupied for their intended use.

3.3 INSTALLATION

- A. General: Install stretched-fabric systems in accordance with system manufacturer's written instructions.
 1. Install presentation rail at lower edge of stretched fabric wall system where indicated, prior to installing stretched fabric wall system.
 2. Provide continuous perimeter frames of each profile indicated, designed to be inconspicuous when covered by fabric facing, with smooth edges, and with surface finish that will not telegraph through fabric facing.
 3. Install framing around penetrations.
 4. Tightly fit framing to adjacent construction and securely attach to substrate.

5. Install core material with full coverage, flush with face of stretched-fabric system frame.
 6. Attach frame and core to substrate with adhesive or fasteners or both to support system and prevent deformation of components.
 7. Install stretched-fabric systems vertical and plumb, unless otherwise indicated; true in plane; and with fabric square to the grain.
 8. Install jointed panels with butt joints as indicated.
 9. Provide wood or plywood nailing strips and blocking as indicated on Drawings.
- B. Measure each area and establish layout of panels of uniform size with balanced borders at opposite edges within a given area, unless otherwise indicated on Drawings.
- C. Where metal framing provides fabric support and is not covered by gypsum board, spray apply damping compound directly to framing. Follow manufacturer's directive for any necessary metal preparation. Cover one side of the framing completely to a minimum of 1/2 metal gage thickness. Damping compound may be applied after framing is installed.
- D. Install fabric track on continuous 4-inch wide by plywood strips when thickness of panels exceeds frame depth. Install strips over kiln-dried wood framing or damped steel framing.
- E. Tightly fit framing to adjacent construction and securely attach to substrate according to stretched-fabric wall system manufacturer's written instructions.
- F. Provide framing around penetrations.
- G. Install core material with full coverage, flush with face of stretched-fabric wall system track. Bond or fasten core material to substrate by method recommended in writing by stretched-fabric wall system manufacturer.
- H. Fabric Installation: Apply fabric monolithically in continuous run over area, without joints or reveals, except where panel joints or midspan frames are indicated.
1. Fabric Sequence: Maintain sequence of fabric drops; match and level fabric pattern and grain.
 2. Fabric Alignment: Install fabric with patterns or directional weaves so pattern or weave aligns with adjacent panels.
 3. Fabric Seams: Sewn seams are not permitted.
 4. Stretch and secure fabric to frame edges and so frame and frame attachment method are concealed by fabric unless otherwise indicated.
 5. Stretch fabric taught and square without puckers, ripples, or distortions. Acclimatize and restretch if recommended by stretched-fabric system manufacturer. Repair distortions, wrinkles, and sagging.
- I. Install fabric stretched monolithically in continuous run without joints or reveals.
- J. Where removable fabric panels are indicated, such as at surround loudspeakers provide fabric stretched over wood frames.
- K. Do not install framing or strips in front of loudspeakers, coordinate with Owner.

- L. Where indicated to protect fabric from denting, install continuous horizontal 1-1/2-inch wide by 1/2-inch thick plywood strips spaced to 2 inches apart directly under the fabric surface.

3.4 INSTALLATION TOLERANCES

- A. Edge Straightness: Plus or minus 1/16 inch (1.6 mm).
- B. Variation from Level and Plumb: Plus or minus 1/16 inch (1.6 mm).
- C. Variation of Panel-Joint Width: Not more than 1/32 inch (0.79 mm) from hairline.

3.5 FIELD QUALITY CONTROL

- A. To facilitate any acoustical "tuning" notify Architect and Acoustical Consultant prior to installing fabric or other coverings over acoustical treatments.

3.6 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.
- C. Remove surplus materials, rubbish, and debris resulting from installation, on completion of the Work, and leave areas of installation in a neat and clean condition.

3.7 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure stretched fabric ceiling panels are without damage or deterioration at time of Substantial Completion.
- B. Replace panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.8 DEMONSTRATION

- A. Maintenance Service: Provide 2 hours training of Owner's Personnel in the proper cleaning of grille cloth.
- B. Demonstration: Upon acceptance of project, provide full instructions and demonstrate to Owner's designated representatives the proper methods of replacement of grille cloth if damaged.

END OF SECTION

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SECTION 09 91 13

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Steel.
 - 2. Galvanized metal.
 - 3. Concrete.

- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
 - 4. Division 09 Section "Interior Painting" for surface preparation and the application of paint systems on interior substrates.
 - 5. Division 09 Section "High Performance Coatings" for surface preparation and the application of high performance coatings.

- D. Paint exposed surfaces, except where the paint schedules indicate that a surface receives another coating, material is not to be painted or is to remain natural. If paint schedules do not specifically mention an item or a surface, paint item or surface same as similar adjacent materials or surfaces whether or not schedules indicate colors. If schedules do not indicate color or finish, Architect will select from standard colors and finishes available.

- E. Do not paint prefinished items, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include following factory-finished components:

- a. Prefinished Metal wall, soffit and roof panels.
- b. Prefinished flashings and copings.
- c. Finished mechanical and electrical equipment.
- d. Light fixtures.
2. Finished metal surfaces include following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper.
 - e. Bronze and brass.
3. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
4. Concrete Masonry and Concrete, unless painting is indicated.
5. Brick masonry.

1.2 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
 3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
 4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
 5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.

- 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
1. Submit Samples on rigid backing, 200 mm (8 inches) square.
 2. Step coats on Samples to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 2. VOC content.
- 1.4 MAINTENANCE MATERIAL SUBMITTALS
- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Paint: 5 percent, but not less than 3.8 L (1 gal.) of each material and color applied.
- 1.5 QUALITY ASSURANCE
- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a 5 year record of successful in-service performance.
- B. Source Limitations: Obtain primers and undercoat materials for each coating system from same manufacturer as finish coats.
- C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 9 sq. m (100 sq. ft.).
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and following information:
 1. Product name or title of material.
 2. Product description (generic classification or binder type).
 3. Manufacturer's stock number and date of manufacture.
 4. Contents by volume, for pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.
 7. Color name and number.
 8. VOC content.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 7 deg C (45 deg F).
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 10 and 35 deg C (50 and 95 deg F).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 3 deg C (5 deg F) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Sherwin-Williams Company (The).
 2. H&C; Concrete (A Sherwin Williams Company).

- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience. Verify compatibility with existing paint systems and materials.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
 - 3. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- D. Colors: Provide custom colors of the finished paint systems to match the Architect's samples.
- E. Lead: Provide paint containing no lead.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.
- D. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify Architect about anticipated problems using materials specified over substrates primed by others.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Provide all surface preparation as recommended by the paint manufacture, including cleaning of existing surfaces to be repainted.
- C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- D. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 SURFACE PREPARATION OF PREVIOUSLY COATED SURFACES

- A. General:
 - 1. Remove cracked and deteriorated sealants and caulking.
 - 2. Remove chalk deposits and loose, blistered, peeling, scaling, or crazed finish to bare base material or sound substrate by scraping and sanding.
 - 3. Wash surfaces with solution of TSP to remove wax, oil, grease, and other foreign material; rinse, and allow to dry. Exercise caution that TSP solution does not soften existing coating.
 - 4. Abrade glossy surfaces by sanding or wiping with liquid de-glosser.
 - 5. Remove mildew as specified above.
 - 6. Test compatibility of existing coatings by applying new coating to small, inconspicuous area. If new coatings lift or blister existing coatings, provide test results and recommendations from paint manufacturer to Architect.
 - 7. Apply specified primer to surfaces scheduled to receive coatings.
- B. Metal:
 - 1. Remove rust from surfaces to bare metal in accordance with SP3 "Power Tool Cleaning".
 - 2. Exercise care not to remove galvanizing.
 - 3. Complete preparation as specified for new work.
- C. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- F. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
 - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 - 3. Use only thinners approved by paint manufacturer and only within recommended limits.

3.4 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. This schedule applies to exterior steel and galvanized steel, not indicated to receive a high performance coating.
- B. Ferrous Metal, Semi-gloss, Exterior Alkyd-Enamel Finish: Primer is not required on shop-primed items; touch up shop primer where provided.
 - 1. Sherwin-Williams:
 - a. Prime Coat: Direct-to-Metal B55 Series.
 - b. Intermediate: Same as prime coat.
 - c. Top Coat: Same as intermediate coat.
- C. Zinc-Coated (Galvanized) Metal, Semi-gloss Exterior Alkyd-Enamel Finish: Primer is not required on shop-primed items; touch up shop primer where provided.
 - 1. Sherwin-Williams:
 - a. Prime Coat: Galvite Paint No. B50W3.
 - b. Intermediate Coat: Direct-to-Metal B55 Series.
 - c. Top Coat: Same as intermediate coat.
- D. Concrete Substrates, Traffic Surfaces: Solvent-Based Solid Color Sealer with slip resistant additive:
 - 1. H&C; Concrete (A Sherwin Williams Company):
 - a. First coat: H&C® COLORTOP Solvent-Based Solid Color Concrete Sealer.
 - b. Second coat: Same as first coat.
 - 2. H&C: Sharkgrip.
 - a. Add to sealer according to manufacturer's instructions.

END OF SECTION

SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
1. Concrete.
 2. Concrete masonry units (CMU).
 3. Steel.
 4. Galvanized metal.
 5. Aluminum (not anodized or otherwise coated).
 6. Wood.
 7. Gypsum board.
 8. Cotton or canvas insulation covering.
 9. All exposed surfaces that are not pre-finished shall be painted, including exposed mechanical and electrical items.
 10. This Section includes marking and identification of Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.
- B. Sustainable Building Requirements:
1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 4. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
 5. Division 09 painting Sections for high performance coatings.
 6. Division 09 Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

- D. Paint exposed surfaces, in finished spaces except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If paint schedules do not specifically mention an item or a surface, paint item or surface same as similar adjacent materials or surfaces whether or not schedules indicate colors. If schedules do not indicate color or finish, Architect will select from standard colors and finishes available.
1. Painting within tenant spaces is not included in the Work, unless otherwise indicated.
 2. Metal Stairs: Paint exposed surfaces including underside.
 3. Fire Extinguisher Cabinets: Paint exposed exterior of cabinets, doors and trim to match the adjacent wall surface.
- E. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include following factory-finished components:
 - a. Architectural woodwork and casework.
 - b. Wood doors.
 - c. Metal lockers.
 - d. Elevator entrance doors and frames.
 - e. Elevator equipment.
 - f. Finished mechanical and electrical equipment.
 - g. Light fixtures.
 - h. Distribution cabinets.
 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. Utility tunnels.
 - d. Pipe spaces.
 - e. Duct shafts.
 - f. Elevator shafts.
 3. Finished metal surfaces include following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper.
 - e. Bronze and brass.
 4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
 5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.2 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.

2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

- D. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 2. VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a 5 year record of successful in-service performance.
- B. Source Limitations: Obtain primers and undercoat materials for each coating system from same manufacturer as finish coats.
- C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 9 sq. m (100 sq. ft.).
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Provide interior painting for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - a. Mockups: See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring metal fabrications.
 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 7 deg C (45 deg F).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 10 and 35 deg C (50 and 95 deg F).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 3 deg C (5 deg F) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by Sherwin-Williams Company (The), and by H&C; Concrete (A Sherwin Williams Company).
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, verify compatibility with existing paint systems and materials, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

3. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. LEED Performance Requirements
1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide available panit products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
 3. Provide available paint products with manufacturer's product-specific Health Product Declarations (HPDs).
 4. Provide available paint products products with Greenguard Gold Certification.
- D. Colors: Provide custom colors of the finished paint systems to match the Architect's samples.

2.3 PAINT SCHEDULE

- A. Refer to Schedule at end of Part 3 of this Section.

2.4 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.
 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Plaster: 12 percent.
 - 5. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.
- F. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify Architect about anticipated problems using materials specified over substrates primed by others.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Provide all surface preparation as recommended by the paint manufacture, including cleaning of existing surfaces to be repainted.
- C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- D. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 SURFACE PREPARATION OF PREVIOUSLY COATED SURFACES

- A. General:

1. Remove cracked and deteriorated sealants and caulking.
 2. Remove chalk deposits and loose, blistered, peeling, scaling, or crazed finish to bare base material or sound substrate by scraping and sanding.
 3. Wash surfaces with solution of TSP to remove wax, oil, grease, and other foreign material; rinse, and allow to dry. Exercise caution that TSP solution does not soften existing coating.
 4. Abrade glossy surfaces by sanding or wiping with liquid de-glosser.
 5. Remove mildew as specified above.
 6. Test compatibility of existing coatings by applying new coating to small, inconspicuous area. If new coatings lift or blister existing coatings, provide test results and recommendations from paint manufacturer to Architect.
 7. Apply specified primer to surfaces scheduled to receive coatings.
- B. Metal:
1. Remove rust from surfaces to bare metal in accordance with SP3 "Power Tool Cleaning".
 2. Exercise care not to remove galvanizing.
 3. Complete preparation as specified for new work.
- C. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- F. Aluminum Substrates: Remove loose surface oxidation.
- G. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- 3.4 APPLICATION
- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Lightweight and regular concrete masonry that is coated with an epoxy shall have a pinhole free surface at finish.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 FIRE WALL MARKING AND IDENTIFICATION

- A. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions:
1. Stenciling:
 - a. "FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS."
 2. Size: not less than 3 inches (76 mm) in height with a minimum 3/8 inch (9.5 mm) stroke.
 3. Location:

- a. In accessible concealed floor, floor-ceiling spaces.
- b. Both sides of walls, within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition and at least one message for each room.

3.7 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces: Eggshell Acrylic Enamel Finish.
 1. Sherwin Williams:
 - a. Prime Coat Coat-Smooth Surfaces: Loxon Concrete & Masonry Primer, A24W8300.
 - b. Prime coat at sand blasted or porous concrete: PrepRite Block Filler B25W25.
 - c. Intermediate Coat: Interior latex matching topcoat.
 - d. Topcoat: ProMar 200 Zero VOC Interior Latex Eg-Shel, B20W4600 Series.
- B. Concrete Substrates, Nontraffic Surfaces: Flat Acrylic Enamel Finish.
 1. Sherwin Williams:
 - a. Prime Coat Coat-Smooth Surfaces: Loxon Concrete & Masonry Primer, A24W8300.
 - b. Prime coat at sand blasted or porous concrete: PrepRite Block Filler B25W25.
 - c. Intermediate Coat: Interior latex matching topcoat.
 - d. Topcoat: ProMar 200 Zero VOC Interior Latex Flat, B30W04650 Series.
- C. Concrete Substrates, Nontraffic Surfaces: Sealer/Stain:
 1. H&C; Concrete (a Sherwin Williams Company):
 - a. Top coat: H&C® Paver Sealer Natural Look Water Based.
- D. CMU Substrates: Eggshell Acrylic Enamel Finish.
 1. Sherwin Williams:
 - a. Prime coat: PrepRite Block Filler B25W25.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: ProMar 200 Zero VOC Interior Latex Eg-Shel, B20W4600 Series.
- E. CMU Substrates: Semi-Gloss Epoxy.
 1. Sherwin Williams:
 - a. Prime coat: Loxon Block Surfacer
 - b. Intermediate Coat: Water-based Epoxy matching topcoat.
 - c. Topcoat: Pro Industrial™ Zero VOC Catalyzed Acrylic Epoxy, B73-300 Series
- F. Steel Substrates: Semi-Gloss Latex Enamel.
 1. Sherwin Williams:
 - a. Prime Coat: Pro Industrial Pro-Cryl Universal Primer B66-310.
 - b. Intermediate Coat: Interior acrylic matching topcoat.
 - c. Topcoat: S-W Pro Industrial Zero VOC Semi-Gloss Acrylic, B66-650 Series.

- G. Galvanized-Metal Substrates: Semi-Gloss Latex Enamel.
 - 1. Sherwin Williams:
 - a. Prime Coat: Pro Industrial Pro-Cryl Universal Primer B66-310.
 - b. Intermediate Coat: Interior acrylic matching topcoat.
 - c. Topcoat: S-W Pro Industrial Zero VOC Semi-Gloss Acrylic, B66-650 Series.

- H. Aluminum Substrates (Not anodized or pre-finished): Semi-Gloss Latex Enamel.
 - 1. Sherwin Williams:
 - a. Prime Coat: Pro Industrial Pro-Cryl Universal Primer B66-310.
 - b. Intermediate Coat: Interior acrylic matching topcoat.
 - c. Topcoat: S-W Pro Industrial Zero VOC Semi-Gloss Acrylic, B66-650 Series.

- I. Gypsum Board Wall Substrates: Eggshell Acrylic Enamel Finish.
 - 1. Sherwin Williams:
 - a. Prime coat: PROMAR 200, Zero VOC Interior Latex Primer B28W02600.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: ProMar 200 Zero VOC Interior Latex Eg-Shel, B20W4600 Series.

- J. Gypsum Board Ceiling Substrates: Flat Acrylic Enamel Finish.
 - 1. Sherwin Williams:
 - a. Prime coat: PROMAR 200, Zero VOC Interior Latex Primer B28W02600.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: ProMar 200 Zero VOC Interior Latex Flat, B30W4600 Series.

- K. Glass-mat Gypsum Board Bathroom Wall and Ceiling Substrates: Mold Resistant Eggshell Acrylic Enamel Finish.
 - 1. Sherwin Williams:
 - a. Prime coat: Interior latex matching topcoat.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: EMERALD Acrylic Interior/Exterior Latex, Matte, K36 Series.

- L. Gypsum Board Substrates: Semi-Gloss Epoxy Finish.
 - 1. Sherwin Williams:
 - a. Prime Coat: PrepRite 200 Latex Wall Primer B28W200 Series.
 - b. Intermediate Coat: Epoxy matching topcoat.
 - c. Topcoat: Pro Industrial HB/ Waterbased Epoxy, B71W111/B71W110 Series.

- M. Wood/Plywood Substrates: Semi-gloss Acrylic-Alkyd Enamel.
 - 1. Sherwin Williams:
 - a. Prime Coat: Premium Wall and Wood Primer B28W8111.
 - b. Intermediate Coat: Interior alkyd matching topcoat.
 - c. Topcoat: ProClassic Interior Waterbased Acrylic-Alkyd Semi-Gloss, B34-850 Series.

- N. Clear Woodwork, water based, wubbed effect-Varnish Finish: 2 finish coats of water-based, clear varnish.
 - 1. Sherwin-Williams:
 - a. First Coat: SHER-WOOD, KEM AQUA Plus CLEAR, CC-F62 Series, Medium Rubbed Effect T75F557 1.3 mils DFT.
 - b. Top Coat: Same as first coat.

- O. Black Enamel Finish: Duct throats for 24 inches behind air return grills and wood blocking exposed at reveals. Flat Acrylic Finish.
 - 1. Sherwin Williams:
 - a. Topcoat: ProMar 200 Zero VOC Interior Latex Flat, B30W4600 Series.
 - 2. Color: Black.

END OF SECTION

SECTION 09 96 00

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and application of high-performance coating systems on the following substrates:
 - 1. Exterior Substrates:
 - a. Steel.
 - b. Galvanized steel.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections include the following:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
 - 4. Division 09 painting Sections for general field painting.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
1. Submit Samples on rigid backing, 8 inches square.
 2. Step coats on Samples to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.
- D. Samples for Warranty Verification: For each type of coating system and in each color and gloss of finish coat indicated.
1. Submit sample sets to Manufacturer, Owner, and Contractor.
- E. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- 1.3 QUALITY ASSURANCE
- A. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and coating systems indicated.

- B. Mockups: Apply benchmark samples of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each type of coating and substrate.
 - a. Stair stringer, risers and guardrail: Provide samples of at least one stair run.
 - b. Other Items: Architect will designate items or areas required.
 - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 - 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.4 WARRANTY

- A. Special Finish Warranty: Standard form in which manufacturer and applicator jointly agrees to repair finishes or replace finish that shows evidence of deterioration of shop-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 15 years from date of Substantial Completion.
 - 3. Manufacturer is to verify color selected is qualified for Warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 GENERAL

A. LEED Performance Requirements

1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".

2.2 MANUFACTURERS

- #### A. Manufacturer: Subject to compliance with the requirements, provide products listed by Tnemec Company Inc.

2.3 HIGH-PERFORMANCE COATINGS

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. Provide products of same manufacturer for each coat in a coating system.

- #### B. Colors: Match Architect's samples.

2.4 METAL PRIMERS

- #### A. Primer for shop application: Zink-Rich Aromatic Urethane primer applied at spreading rate recommended by manufacturer.

1. Tnemec: Series 94-H2O Hydro-Zinc; 2.5-3.5 mils DFT,.

2.5 EPOXY INTERMEDIATE COAT

- #### A. Intermediate Coat: Epoxy applied at spreading rate recommended by manufacturer.

1. Tnemec: Series 27WB Typoxy; DFT: 4.0 to 6.0 mils,.

2.6 FLUOROPOLYMER TOPCOAT

- #### A. Topcoat: Gloss Metallic or Pearlescent Fluoropolymer enamel applied at spreading rate recommended by manufacturer.

1. Tnemec: Series 1078V Fluoronar Metallic; DFT: 2.0 to 3.0 mils,.

- #### B. Clear Coat: Gloss Un-Pigmented Fluoropolymer enamel applied at spreading rate recommended by manufacturer.

1. Tnemec: Series 1078V Fluoronar Metallic; DFT: 2.0 to 3.0 mils,.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 3. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
- D. Steel Substrates: Remove rust and loose mill scale.
 - 1. Surface Preparation: Abrasive blast in accordance with SSPC-SP6 with a minimum angular anchor profile of 2.0 mils.
- E. Galvanized Steel Substrates: Visible deposits of oil, grease, or other contaminants shall be removed as required by SSPC-SP1. Sweep (Abrasive) Blasting per SSPC-SP16 to achieve a uniform anchor profile (1.0 to 2.0 mils). Galvanized surfaces must be clean, dry, and contaminant free prior to application of coatings.

3.3 APPLICATION

- A. Location and method of application:
 - 1. Shop application by spray is preferred.
 - 2. Field application by spray is accepted. Field application by other methods approved by the Manufacturer may be accepted by the Architect based on reference samples.
- B. Apply high-performance coatings according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for coating and substrate indicated.
- C. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match

color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

- D. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- E. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.
- F. Metallic Finish Application: Apply metallic finished according to Manufacturer's Metallic Finish Application Instructions. Apply to provide a uniform metallic appearance, on multiple surfaces.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when coatings are being applied:
 - 1. Owner will engage the services of a qualified testing agency to sample coating material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with specified requirements.
 - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with specified requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 HIGH-PERFORMANCE COATING SCHEDULE

- A. Exterior Steel Substrates:
 - 1. Polyurethane, Pigmented, Over Epoxy Coating System:
 - a. Prime Coat: Zink rich primer.
 - b. Intermediate Coat: Epoxy.

- c. First Topcoat: Fluoropolymer, two-component, pigmented, full-gloss metallic, or semi-gloss.
 - d. Second Topcoat: Same as first coat.
 - e. Clear coat: Fluoropolymer, two-component, un-pigmented.
 - f. Colors and gloss: Match Architect's samples, Provide semi-gloss, or full-gloss metallic, as indicated.
 2. Substrates include but are not limited to:
 - a. Exterior exposed Structural-Steel, Architecturally Exposed Structural Steel and steel fabrications.
 - b. Exterior steel indicated to receive High Performance Coating.
- B. Exterior Galvanized Steel Substrates:
 1. Polyurethane, Pigmented, Over Epoxy Coating System:
 - a. Prime Coat: Omit prime coat, prepare galvanizing for intermediate coat.
 - b. Intermediate Coat: Epoxy.
 - c. First Topcoat: Fluoropolymer, two-component, pigmented, semi-gloss.
 - d. First Topcoat: Fluoropolymer, two-component, pigmented, full-gloss metallic, or semi-gloss.
 - e. Second Topcoat: Same as first coat.
 - f. Clear coat: Fluoropolymer, two-component, un-pigmented.
 - g. Colors and gloss: Match Architect's samples, Provide semi-gloss, or full-gloss metallic, as indicated.
 2. Substrates include but are not limited to:
 - a. Supports for exterior screens.
 - b. Exterior exposed Galvanized Structural-Steel supporting the helipad.
 - c. Exterior exposed Galvanized Structural-Steel, Galvanized Architecturally Exposed Structural Steel and Galvanized steel fabrications.
 - d. Exterior galvanized steel indicated to receive High Performance Coating.

END OF SECTION

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SECTION 10 11 00

VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Porcelain enamel marker boards.
 - 2. Porcelain enamel marker boards with special purpose graphics.
 - 3. Glass marker boards.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 - 2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 4. Section 08 81 13 "Decorative Glass Glazing" for additional glass marker surfaces.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of visual display board and surface indicated.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.

- b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For each type of visual display board required.
- 1. Include dimensioned elevations. Show location of joints between individual panels where unit dimensions exceed maximum panel length.
 - 2. Include sections of typical trim members.
 - 3. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
 - 4. Show layout and locations of lined markerboards.
 - 5. Show locations and layout of special-purpose graphics.
- D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and textures available for the following:
- 1. Porcelain enamel marker boards.
 - 2. Porcelain enamel marker boards with special purpose graphics.
 - 3. Glass marker boards.
- E. Samples for Verification:
- 1. Markerboards:
 - a. Actual sections of porcelain enamel finish for each type of markerboard required.
 - b. Actual sections of glass markerboards for each type of glass markerboard required.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who is an authorized representative of chalkboard manufacturer for both installation and maintenance of the type of sliding chalkboard units required for this Project.
- B. Source Limitations: Obtain visual display boards through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide tackboards with the following surface-burning characteristics as determined by testing assembled materials composed of facings and backings identical to those required in this Section per ASTM E 84 by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify tackboards with appropriate markings of applicable testing and inspecting agency.
 - 1. Flame Spread: 25 or less.
 - 2. Smoke Developed: 10 or less.
- D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Provide visual display surfaces for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - a. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring visual display surfaces.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify field measurements before preparation of Shop Drawings and before fabrication to ensure proper fitting. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating chalkboards without field measurements. Coordinate wall construction to ensure actual dimensions correspond to established dimensions.

1.5 WARRANTY

- A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Surfaces lose original writing and erasing qualities.
 - b. Surfaces exhibit crazing, cracking, or flaking.
 - 2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide Visual Display products of each Type by one of the following:
 - 1. Porcelain Enamel:
 - a. Claridge Products and Equipment, Inc.
 - b. Neal Slate
 - c. CustomPrintedBoards.com.
 - 2. Glass Markerboards:
 - a. Claridge Products and Equipment, Inc.
 - b. Goldray industries.
 - c. Glass Art.

2.2 MATERIALS

- A. Porcelain Enamel Markerboards: Balanced, high-pressure-laminated, porcelain enamel chalkboards of 3-ply construction consisting of face sheet, core material, and backing.
 - 1. Face Sheet: 0.0239-inch (24 gage) enameling grade steel especially processed for temperatures used in coating porcelain on steel. Coat exposed face and edges with a 3-coat process consisting of primer, ground coat, and color cover coat. Coat concealed face with a 2-coat process consisting of primer and ground coat. Fuse cover and ground coats to steel at manufacturer's standard firing temperatures, but not less than 1200 deg F.
 - a. Cover Coat: Provide manufacturer's standard, light-colored, special writing surface with semi-matte finish intended for use with erasable dry markers.
 - 2. Core: 1/2-inch- thick, particleboard core material complying with requirements of ANSI A208.1, Grade 1-M-1.
 - 3. Backing Sheet: 0.015-inch- thick, aluminum-sheet backing.
 - 4. Laminating Adhesive: Manufacturer's standard, moisture-resistant, thermoplastic-type adhesive.
- B. Particleboard: ANSI A208.1, Grade M-1, made with binder containing no urea formaldehyde.
- C. Fiberboard: ASTM C 208, made with binder containing no urea formaldehyde.
- D. Extruded Aluminum: ASTM B 221, Alloy 6063.
- E. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent glass, flat); Quality q3 (glazing select)
 - 1. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

2.3 MARKERBOARDS

- A. Framed Markerboard: Factory assembled laminated porcelain markerboard unit with aluminum frame and accessories.
 - 1. Porcelain Dry Erase Surface.
 - 2. Silver Anodized framing.
 - 3. Color: As indicated on the Drawings.
 - 4. Patient Care Boards: Special-Purpose Graphics.

- B. Glass Markerboards: Factory assembled glass markerboard.
 - 1. Glass Dry Erase Surface.
 - 2. Back paint.
 - 3. Z spline mounting.
 - 4. Magnetic, unless otherwise indicated on the Drawings.
 - 5. Color: As indicated on the Drawings, or if not indicated, as selected by the Architect.
 - 6. Graphics: Include special purpose graphics.

2.4 ACCESSORIES

- A. Metal Trim and Accessories: Fabricate frames and trim of not less than 0.062-inch-thick, extruded-aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single-length units. Keep joints to a minimum. Miter corners to a neat, hairline closure.
 - 1. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.
 - 2. Marker tray: Manufacturer's standard, continuous, solid, extrusion-type, aluminum marker tray with ribbed section and smoothly curved exposed ends for each marker board.
 - 3. Trim between adjacent board sections: T trim.
- B. Sealants and Adhesives: Comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Adhesive: Adhesive recommended by the manufacturer.
 - 1. VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Sealant: Mildew-resistant Silicone sealant meeting the requirements of Section 07 90 00 "Sealants."

2.5 FABRICATION

- A. Assembly: Provide factory-assembled chalkboard units, unless field-assembled units are required.
 - 1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.
 - 2. Provide manufacturer's standard vertical joint system between abutting sections of markerboard.
- B. Joints: Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect. Provide hidden spline between abutting sections of visual display panels.

- C. Combination Assemblies: Provide H-trim between abutting sections of visual display panels.
- D. Special-Purpose Graphics: Fuse or paint graphic onto surface of porcelain-enamel visual display unit, or glass visual-display unit, in locations indicated.
 - 1. Patient Care Boards: As approved by Owner, information may include:
 - a. Title.
 - b. Room Number.
 - c. Name.
 - d. Telephone number.
 - e. Care team.
 - 1) RN.
 - 2) Physician.
 - 3) Provider.
 - 4) NA.
 - 5) Additional Members.
 - f. Diet.
 - g. Activity.
 - h. What's important to me.
 - i. Goals for today.
 - j. Questions.
 - k. Anticipated discharge date.
 - l. Plan of care.
 - m. Pain scale:
 - 1) Pain scale graphics.
 - n. Pain Plan.
 - o. Last Does.
 - p. Next Dose.
 - q. Hourly Rounding.
 - r. Every 2 hours from 10:00 PM -6:00 AM
 - s. Hours of the day, AM and PM matrix.
 - t. Additional Owner requested text and graphics.

2.6 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine wall surfaces, with Installer present, for compliance with requirements and other conditions affecting installation of visual display boards.

1. Surfaces to receive chalkboards or markerboards shall be free of dirt, scaling paint, and projections or depressions that would affect smooth, finished surfaces of chalkboards or markerboards.
2. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible. If dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.
- B. Install units in locations and at mounting heights indicated and according to manufacturer's written instructions. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- C. Coordinate Project-site-assembled units with grounds, trim, and accessories. Join parts with a neat, precision fit.
- D. Seal perimeter of glass marker boards to the wall with silicone sealant.

3.3 ADJUSTING AND CLEANING

- A. Verify that accessories required for each unit have been properly installed and that operating units function properly.
- B. Clean units according to manufacturer's written instructions.

END OF SECTION

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SECTION 10 21 23

CUBICLE CURTAINS AND TRACKS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Curtain tracks.
 - 2. Cubical curtains.
 - 3. Shower curtains.
- B. Sustainable Design Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include durability, laundry temperature limits, fade resistance, applied curtain treatment, and fire-test-response characteristics for each type of curtain fabric indicated.
 - 2. Include data for each type of track.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings:
1. Show layout and types of cubicles, sizes of curtains, number of carriers, anchorage details, and conditions requiring accessories. Indicate dimensions taken from field measurements.
 2. Include details on blocking above ceiling.
- D. Samples for Verification: For each type of product required, prepared on Samples of size indicated below:
1. Curtain Fabric: 10-inch- (254-mm-) square swatch or larger as required to show complete pattern repeat, from dye lot used for the Work, with specified treatments applied. Mark top and face of material.
 2. Mesh Top: Not less than 10 inches (254 mm) square.
 3. Curtain Track: Not less than 10 inches (254 mm) long, of each type.
 4. Curtain Carrier: Full-size unit, of each type.
- ### 1.3 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For curtains, track, and hardware to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Accessibility: Comply with 36 CFR, Part 1191, the Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines (ADA/ABAAG) and Section 504 of the Rehabilitation Act of 1973, as amended, which generally requires non-discrimination against physically impaired persons.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of each type of curtain and track.
 - 2. Provide curtains and tracks for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - a. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring metal fabrications.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Curtains: Provide curtain fabrics with the following characteristics:
 - 1. Flame resistant and identical to those that have passed NFPA 701 when tested by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - a. Identify fabrics with appropriate markings of a qualified testing agency.

2.2 CUBICAL CURTAIN TRACK [CCT-1]

- A. Manufacturer: On the Right Track Systems, Inc., 174 Hudson Street, New York, NY 10013, Tel. 212-625-6630, www.ontherighttrack.com.
- B. Cubicle Curtain Track:
 - 1. Surface Mounted Track: Extruded aluminum.
 - a. Powder-coat finish, white.
 - 2. Dimensions: 1 1/2 inches (39 mm) high by 3/8 inch (10 mm) wide.
 - 3. Provide straight and bent sections as indicated on drawings.
 - 4. Accessories: Provide the following components. Coordinate locations with those found on the Drawings.
 - a. CE-OPTS-S03, Thumb Screw with Fastener.
 - b. CE-OPTS-M03, Combo End Cap
 - c. CE-OPTS-E03, Hanger and Track Connector.
 - d. CE-OPTS-F03, Track Connector.
 - e. CE-OPTS-B03, Hard Ceiling Mounting Plate.
 - f. CE-OPTS-M03, End Cap.
 - g. CE-OPTS-G03, Hanger.
 - h. CE-OPTS-P03, Ceiling Vertical Mount Plate.
 - i. CE-OPTS-J03-1, 1' Extensible Square Tube.
 - j. CE-OPTS-J03-2, 2' Extensible Square Tube.
 - k. CE-OPG-005, Grabber (curtain loading tool).

I. CE-OPTS-LZ, Loading Zone

2.3 CUBICAL CURTAIN TRACK [CCT-2]

- A. Cubicle Curtain Track: Not less than 1-1/4 inches wide by 3/4 inch high (32 mm wide by 19 mm high).
 - 1. Track Minimum Wall Thickness: Manufacturer's standard.
 - 2. Curved Track: Factory-fabricated, 12-inch- (305-mm-) radius bends.
 - 3. Finish: Satin anodized.
- B. Curtain Roller Carriers: Two nylon rollers and nylon axle with chrome-plated steel hook.
- C. Exposed Fasteners: Stainless steel.

2.4 CURTAINS

- A. Cubicle Curtains: Manufacturer's inherently fire-retardant (IFR) curtain with panel, mesh and top designed for attachment to track without separate hooks for CCT-1, and with hooks for CCT-2.
 - 1. Cubical curtain fabric: As indicated in the Materials Legend, on the Drawings.
 - 2. Panel Size: 69 inches wide by 92 inches high including 19 inches of mesh, hemmed as required.
 - 3. Style: As indicated on the Drawings.
 - 4. Curtain Loading Tool: Manufacturer's standard loading tool, The Grabber.
 - 5. Curtain Ring: Color: Match Architect's sample.
- B. Curtain Tieback: Nickel-plated brass chain; one at each curtain termination.
- C. Shower Curtains: Manufacturer's inherently fire-retardant (IFR) curtain with panel, mesh and top designed for attachment to track without separate hooks for CCT-1, and with hooks for CCT-2.
 - 1. Shower curtain fabric: As indicated in the Materials Legend, on the Drawings.
 - 2. Panel Size: 69 inches wide by 92 inches high including 19 inches of mesh, hemmed as required.
 - 3. Style: As indicated on the Drawings, see Sheet A52-2.
 - 4. Curtain Loading Tool (for CCT-1): Manufacturer's standard loading tool, The Grabber.
 - 5. Curtain Ring color (for CCT-1): As selected from Manufacturer's standard.

2.5 CURTAIN FABRICATION

- A. Fabricate curtains as follows:
 - 1. Width: Equal to track length from which curtain is hung plus 10 percent added fullness, but not less than 12 inches (305 mm) added fullness.
 - 2. Length: Equal to floor-to-ceiling height, minus depth of track and carrier at top, and minus clearance above the finished floor as follows:
 - a. Cubicle Curtains: 12 inches (305 mm).
 - b. Shower curtains: 6 inches (150 mm)
 - 3. Mesh Top: Top hem of mesh, triple thickness, reinforced with integral web, and double lockstitched. Double lockstitch bottom of mesh directly to 1/2-inch (13-mm) triple thickness, top hem of curtain fabric.

4. Bottom Hem: Not less than 1 inch (25.4 mm) and not more than 1-1/2 inches (38 mm) wide, double thickness and double lockstitched.
5. Side Hems: Not less than 1/2 inch (13 mm) and not more than 1-1/4 inches (32 mm) wide, with double turned edges, and single lockstitched.
6. Vertical Seams: Not less than 1/2 inch (13 mm) wide, double turned and double stitched.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install tracks level and plumb, according to manufacturer's written instructions.
- B. Up to 20 feet (6.0 m) in length, provide track fabricated from single, continuous length.
 1. Curtain Track Mounting: Surface.
- C. Surface-Track Mounting: Fasten tracks to ceilings at intervals recommended by manufacturer. Fasten tracks to structure at each splice and tangent point of each corner. Center fasteners in track to ensure unencumbered carrier operation. Attach track to ceiling as follows:
 1. Attach track to suspended ceiling grid with manufacturer's proprietary clip.
- D. Track Accessories: Install splices, end caps, connectors, end stops, coupling and joining sleeves, and other accessories as required for a secure and operational installation.
- E. Curtains: Hang curtains on each curtain track. Secure with curtain tieback.

END OF SECTION

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SECTION 10 26 00

WALL PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Corner guards and end guards.
2. Impact resistant wall coverings.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Section 06 41 16 "Plastic Laminate Clad Architectural Cabinets" for solid-surfacing-clad bumper guard/handrail.
4. Division 08 Section "Door Hardware" for metal armor, kick, mop, and push plates.
5. Division 09 Section "Non-Structural Metal Framing" For metal backing plates.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For each impact-resistant wall protection unit showing locations and extent. Include sections, details, and attachments to other work.
1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Corner Guards: 12 inches long. Include examples of joinery, and corners.
 2. Wall coverings: 12 inches by 12 inches. Include examples, corners, and field splices.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For qualified Installer.
 - B. Material Test Reports: For each impact-resistant plastic material.
- 1.4 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of units installed, but no fewer than two, 4-foot- (1.2-m-) long units.
 2. Impact resistant wall covering: length equal to 2 percent of each type, color, and texture of units installed, but no less than 8-foot- (2.4-m-) long.
- B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of impact-resistant wall protection units from single source from single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Division 01 Section "Quality Requirements."
 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- E. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.
- F. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
 2. Keep plastic sheet material out of direct sunlight.

3. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).
 - a. Store corner-guard covers in a vertical position.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. LEED Performance Requirements
 1. For interior, wet-applied, field installed adhesives, sealants, paints, and coatings, provide products that meet both Volatile Organic Compound (VOC) content limits and emissions testing requirements (General Emissions Evaluation), as outlined in Section 018113 - "SUSTAINABLE DESIGN REQUIREMENTS".
 2. Provide impact resistant wall covering products with manufacturer's product-specific Health Product Declarations (HPDs).
 3. Provide impact resistant wall covering products with Cradle to Cradle certification, at minimum version 2 Basic level or version 3 Bronze level.

2.2 MATERIALS

- A. Plastic: ASTM D543, Class 1, textured, chemical- and stain-resistant, high-impact-resistant non-PVC reformulated PETG plastic with integral color throughout; extruded material, thickness as indicated.
 1. Impact Resistance: Minimum 25.4 ft-lbf/in. (1356 J/m) of notch when tested according to ASTM F476.
 2. Chemical and Stain Resistance: Tested according to ASTM D 1308.
 3. Self-extinguishing when tested according to ASTM D 635.
 4. Flame-Spread Index: 25 or less.
 5. Smoke-Developed Index: 450 or less.
- B. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated, but with not less than strength and durability properties specified in ASTM B 221 (ASTM B 221M) for Alloy 6063-T5.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M.
- D. Fasteners: Nonmagnetic stainless-steel, screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

- E. Adhesive: As recommended by corner guard wall protection manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Low-Emitting Materials: Wall protection adhesives shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 CORNER AND END WALL GUARDS

- A. Surface-Mounted, Metal Corner Guards: Fabricated from one-piece, formed metal with formed edges; with turn to match wall condition.
 - 1. Basis of Design Manufacturer: Subject to compliance with requirements, provide products indicated in the Materials Legend, on the Drawings, or comparable products by one of the following:
 - a. American Floor Products Co., Inc.
 - b. Arden Architectural Specialties, Inc.
 - c. Balco, Inc.
 - d. Construction Specialties, Inc.
 - e. IPC Door and Wall Protection Systems; Division of InPro Corporation.
 - f. Korogard Wall Protection Systems; a division of RJF International Corporation.
 - g. Pawling Corporation.
 - h. Tepromark International, Inc.
 - i. WallGuard.com.
 - 2. Material: Stainless steel, Type 304.
 - a. Thickness: Minimum 0.0500 inch (1.3 mm).
 - b. Finish: Directional satin, No. 4.
 - 3. Wing Size: 2 inches.
 - 4. Height: Full height plus; extend from base to 6 inches above ceiling, unless otherwise indicated, verify heights.
 - 5. Opening surrounds: Corner guards surround opening, including head of opening.
 - a. Length of segments: 12 ft.
 - b. Joints: Space joints equally.
 - 6. Corner Radius: 1/8 inch (3 mm).
 - 7. Mounting: Double sided adhesive tape, or full spread of adhesive.
 - 8. **CG-01**: 90 degree.
 - 9. **CG-02**: 143 degree.
 - 10. **CG-03**: 127 degree.
 - 11. **CG-04**: 55 degree.
 - 12. **CG-05**: 59 degree.
 - 13. **CG-06**: 140 degree.
 - 14. **CG-07**: 125 degree.
 - 15. **CG-08**: 148 degree.
 - 16. **CG 09**: 235 degree.
 - 17. **GC-10**: 100 degree.
 - 18. Field verify corner angles.

2.4 IMPACT-RESISTANT WALL COVERINGS

- A. Impact-Resistant Sheet Wall Covering [**IRWC-1**]: Fabricated from plastic sheet wall-covering material.
1. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated on the Drawings, or comparable product by one of the following:
 - a. Balco, Inc.
 - b. Construction Specialties, Inc.
 - c. IPC Door and Wall Protection Systems; Division of InPro Corporation.
 - d. Korogard Wall Protection Systems; a division of RJF International Corporation.
 - e. Pawling Corporation.
 2. Size: 48 by 96 inches (1219 by 2438 mm) for sheet.
 3. Sheet Thickness: 0.040 inch (1.5 mm).
 4. Color and Texture: As selected by Architect from Manufacturer's full range of colors and textures.
 5. Height: As indicated.
 6. Trim and Joint Moldings: Extruded rigid plastic that matches sheet wall covering color.
 7. Mounting: Water based adhesive sealer.

2.5 FABRICATION

- A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.
- B. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
1. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. General: Install impact-resistant wall protection units according to Manufacturer's instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Impact-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation. Fill with sealant prior to applying panels and bed panels into sealant.

3.4 CLEANING

- A. Immediately after completion of installation, clean stainless steel and accessories using a cleaning agent recommended by the manufacturer. Clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

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SECTION 10 28 00

TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Installation of Owner provided toilet accessories.
2. Mirrors.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
- C. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.
1. Approved full-size Samples will be returned and may be used in the Work.
- D. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
1. Identify locations using room designations indicated.
 2. Identify products using designations indicated.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Warranty: Sample of special warranty.
- 1.4 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.
- 1.5 QUALITY ASSURANCE
- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.7 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 TOILET BATH AND LAUNDRY ACCESSORIES

- 1. Toilet accessories are as indicated on the Drawings.
- 2. The Owner will supply toilet accessories to the Contractor for installation.

2.3 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION

SECTION 10 31 00

MANUFACTURED FIREPLACES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for manufactured LED Electric fireplaces.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections include the following:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 26 Sections for Building electrical systems.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:

- c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- 1. Wiring Diagrams: For power, signal, and control wiring.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
- 1. Size: 6 by 6 inches square.
- E. Manufacturer’s installation instructions.
- F. Field Quality Control Records.
- G. Maintenance Data: To include in maintenance manuals.
- 1.3 REGULATORY REQUIREMENTS
- A. Contractor secure required permits.
 - B. Regulatory Requirements: Comply with provisions of the following product certifications:
 - 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 2. UL and NEMA: Provide electrical components required as part of residential appliances that are listed and labeled by UL and that comply with applicable NEMA standards.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer and Product: Subject to compliance with the requirements, provide Napoleon Allure 50 Model fireplace, or a comparable product, by one of the following.
 - 1. Lennox Hearth Products.
 - 2. Napoleon Quality Fireplaces.
 - 3. Majestic.
 - 4. Montego.
 - 5. Sparks Modern Fires.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, commercial steel, Type B, exposed, black matte finish.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type as appropriate for use.
- C. Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); Fully tempered.
- D. Ember Bed: Glass:
 - 1. Color: As selected by the Architect from Manufacturer's standard colors.

2.3 MANUFACTURED FIREPLACES

- A. General: Provide manufactured fireplace as follows: Provide all components required for a complete system.
 - 1. Model No.: - NEFL50FH.
 - 2. Glass viewing area: 40 9/16"w x 12" h.
 - 3. Outer dimensions: 50"W x 21 5/8"H x 5"D.
 - 4. On/off: Remote switch.
 - 5. Electric: 110V, MAX 1500W.
 - 6. Doors/glass: Tempered glass, with black frame.

7. Interior color: Satin Black.

2.4 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine roughing-in for adjacent substrates to verify actual locations of connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written instructions.
- B. Securely anchor manufactured fireplace to supporting construction with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Utilities: Refer to Divisions 26 for electrical requirements.

3.3 CLEANING AND PROTECTION

- A. Test each item to verify proper operation. Make necessary adjustments.
- B. Verify that accessories required have been furnished and installed.
- C. Leave units in clean condition, ready for operation.

END OF SECTION

SECTION 10 44 00

FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Portable fire extinguishers.
 - 2. Fire-protection cabinets for the following:
 - a. Portable fire extinguishers.
 - 3. Fire-protection accessories.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections include the following:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 09 Section "Painting" for field-painting fire-protection cabinets.

1.2 PERFORMANCE REQUIREMENTS

- A. Accessibility: Comply with 36 CFR, Part 1191, the Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines (ADA/ABAAG) and Section 504 of the Rehabilitation Act of 1973, as amended, which generally requires non-discrimination against physically impaired persons.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.
 - 1. Fire Extinguishers: Include rating and classification.

2. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Schedule: Indicating locations of installation for each Type of fire-extinguisher and cabinet.
- 1.4 QUALITY ASSURANCE
- A. Source Limitations: Obtain fire extinguishers and cabinets through one source from a single manufacturer.
 - B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."

- C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Portable Fire Extinguishers:
 - a. General Fire Extinguisher Corporation.
 - b. J.L. Industries, Inc.
 - c. Kidde: Walter Kidde, The Fire Extinguisher Co.
 - d. Larsen's Manufacturing Company.
 - e. Tyco SimplexGrinnell
 - f. Watrous; Div. of American Specialties, Inc.
 - 2. Fire-Protection Cabinets:
 - a. General Accessory Manufacturing Co.
 - b. J.L. Industries, Inc.
 - c. Larsen's Manufacturing Company.
 - d. Tyco SimplexGrinnell
 - e. Watrous; Div. of American Specialties, Inc.
- B. Basis of Design Products: Subject to compliance with requirements, provide the products matching the existing or comparable products from a listed manufacturer.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: Carbon steel, complying with ASTM A 366/A 366M, commercial quality, stretcher leveled, temper rolled.

2.3 PORTABLE FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers of type, size, and capacity for each cabinet and other locations indicated.
- B. Multipurpose Dry-Chemical Type:
 - 1. UL-rated 3-A:40-B:C, 6-lb nominal capacity, in enameled-steel container.
 - 2. UL-rated 4-A:80-B:C, 10-lb nominal capacity, in enameled-steel container.
 - 3. UL-rated 10-A:120-B:C, 20-lb nominal capacity, in enameled-steel container.

2.4 FIRE-PROTECTION CABINETS

- A. Existing fire protection specialties: The intent is to match fire extinguisher cabinets existing on the 3rd and 4th floors with new cabinets installed on the 6th and 7th floors.
- B. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
 - 1. Cabinet Metal: Enameled-steel sheet.

- C. Cabinet Type: Suitable for the following:
 - 1. Fire extinguisher.
- D. Cabinet Mounting: Suitable for the following mounting conditions:
 - 1. Recessed: Cabinet box fully recessed in walls.
 - 2. Semirecessed: Cabinet box partially recessed in walls of shallow depth to suit style of trim indicated.
 - 3. Surface mounted.
- E. Cabinet Trim Style: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.
 - 1. Recessed: ½ inch projection from wall.
 - 2. Semi-recessed: 2 ½ inch projection from wall.
- F. Cabinet Trim Material: Manufacturer's standard, as follows:
 - 1. Steel sheet.
- G. Door Material: Manufacturer's standard, as follows:
 - 1. Steel sheet.
- H. Door Style: Manufacturer's standard design, as follows:
 - 1. Match existing.
- I. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
 - 1. Provide minimum 1/2-inch- thick door frames, fabricated with tubular stiles and rails, and hollow-metal design.
- J. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

2.5 ACCESSORIES

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure extinguisher, of sizes required for types and capacities of extinguishers indicated, with plated or baked-enamel finish.

2.6 STEEL FINISHES

- A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.
- B. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment.
 - 1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, lead- and chromate-free, universal primer, selected for resistance to normal atmospheric corrosion, for compatibility with substrate and field-applied finish paint system indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

- C. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
 - 1. Color and Gloss: manufacturer's standard.

2.7 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged units.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing fire-protection specialties.
- B. Install in locations and at mounting heights indicated or, if not indicated, at a uniform height acceptable to authorities having jurisdiction.
 - 1. Fasten mounting brackets to structure and cabinets, square and plumb.
 - 2. Fasten cabinets to structure, square and plumb.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust cabinet doors that do not swing or operate freely.
- B. Refinish or replace cabinets and doors damaged during installation.
- C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.

3.4 FIRE-PROTECTION SCHEDULE

- A. Fire Extinguisher **FE-1**: Where this designation is indicated, provide fire extinguisher on wall bracket complying with the following:
1. Portable Fire Extinguisher: Larsen's MP10 (4A-80BC).
 2. Mounting bracket: Larsen's B-2.
- B. Fire Extinguisher **FE-2**: Where this designation is indicated, provide fire extinguisher on wall bracket complying with the following:
1. Portable Fire Extinguisher: Larsen's MP20 (10A-120BC).
 2. Mounting bracket: Larsen's 577.
- C. Fire-Protection Cabinet **FEC-01**: Where this designation is indicated, provide fire-protection cabinet, and fire extinguisher complying with the following:
1. Products: Larsen's, 27 x 9.5 Inch Vista Series Cabinet for up to 10 Lbs ABC Fire Extinguisher - Stainless Steel Door and Frame, Surface Mount, or comparable product.
 2. Cabinet Material: Stainless-steel sheet.
 3. Type: Fire extinguisher.
 4. Mounting: Surface.
 5. Door Material: Stainless-steel sheet.
 6. Door Glazing: Acrylic bubble.
 7. Accessories:
 - a. Mounting brackets, 546.
 - b. Door locks.
 8. Color and Texture:
 - a. Stainless-steel sheet Finish: #4 polish.
 9. Portable Fire Extinguisher: Larsen's MP10 (4A-80BC).
- D. Fire-Protection Cabinet **FEC-02**: Where this designation is indicated, provide fire-protection cabinet, and fire extinguisher complying with the following:
1. Products: Larsen's, 24 x 9.5 X 6 Inch Cabinet for up to 6 Lbs ABC Fire Extinguisher.
 2. Cabinet Material: Enameled-steel sheet.
 3. Type: Fire extinguisher.
 4. Mounting: Recessed.
 5. Trim Style: Exposed.
 - a. Exposed Trim: 1/2 inch.
 6. Cabinet Trim Material: Steel sheet.
 7. Door Material: Steel sheet.
 8. Door Glazing: Match existing.
 9. Door Style: Vertical duo.
 10. Accessories: Mounting brackets, Door locks.
 11. Color and Texture:
 - a. Steel Finish: Tub: Baked white enamel, Door and frame: Primed for field paint.
 12. Portable Fire Extinguisher: Larsen's MP6 (3A-40BC).

- E. Fire-Protection Cabinet **FEC-04**: Where this designation is indicated, provide fire-protection cabinet, and fire extinguisher complying with the following:
1. Products: Larsen's, 27 x 12 X 8 Inch Cabinet for up to 20 Lbs ABC Fire Extinguisher.
 2. Cabinet Material: Enameled-steel sheet.
 3. Type: Fire extinguisher.
 4. Mounting: Recessed.
 5. Trim Style: Exposed.
 - a. Exposed Trim: 1/2 inch.
 6. Cabinet Trim Material: Steel sheet.
 7. Door Material: Steel sheet.
 8. Door Glazing: Double strength float glass.
 9. Door Style: Vertical duo.
 10. Accessories: Mounting brackets, Door locks.
 11. Color and Texture:
 - a. Steel Finish: Tub: Baked white enamel, Door and frame: Primed for field paint.
 12. Portable Fire Extinguisher: Larsen's MP20 (10A-120BC).

END OF SECTION

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SECTION 10 44 45

PHOTOLUMINESCENT EXIT PATH MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Photoluminescent exit path markings, including installation accessories for the following:
 - 1. Stair tread and landing edge nosing strips.
 - 2. Handrail illumination strips.
 - 3. Perimeter illumination strips.
 - 4. Demarcation Way Finding Strips
 - 5. Obstacle Marker illumination strips.
 - 6. Door Signage and Directional Signage
 - 7. Door hardware markings illumination strips.
 - 8. Door frame marking illumination strips.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division 05 Sections "Metal Stairs" for metal stairs and handrails.

1.2 PERFORMANCE REQUIREMENTS

- A. Photoluminescent Exit Path Marking System shall be a complete system of low level way finding materials consisting of door signs, stair nosing strips, leading edge nosing strips, handrail illumination strips, demarcation way finding strips, obstacle markers and directional signs.
- B. Stair Tread and Landing Edge Nosings:
 - 1. Provide photoluminescent strips not less 1 inch (25 mm) wide.

2. Provide stair tread and landing nosing abrasive filled or having a serrated surfaces to improve slip resistance.
 3. Provide stair tread and landing nosing tread surfaces slip resistant as defined in ADA recommendations.
 4. Provide stair tread and landing nosing meeting OSHA Barrier-Free Code requirements for stairs.
 5. Provide stair tread and landing nosing tread surfaces slip resistant as defined in 2010 CBC
- C. Photoluminescent handrail Illumination Strip shall be 1 inch wide; adhered to the handrail with a factory applied adhesive.
- D. Photoluminescent Demarcation Way Finding Strip shall be 1 inch wide; adhered to the floor with a factory applied adhesive.
- E. Photoluminescent Obstacle Markers 1 inch wide; with a pattern of 2 inch photoluminescent strips alternating with 2 inch black bands angled at 45 degrees adhered to all obstacles as defined by the established code.
- F. Directional and Door Signs as a minimum shall be in compliance with IBC 1024 codes.
- G. Stairwell Floor Identification Signage must meet IBC 1024 dimensional and informational requirements.
- H. Photoluminescent Exit Path Marking System shall be tested and listed with an independently recognized test laboratory and comply with UL 1994.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of exit pathway marking indicated, including material description and installation instructions.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Recycled Content.

- d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop drawings: Submit shop drawings showing complete installation details for photoluminescent exit path marking system, including required anchorage to surrounding construction.
- D. Samples: Minimum 6 inch (150 mm) long samples of each specified item
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualifications Data: For Installer.
 - B. Warranties: Signed copies of warranty of terms specified.
- 1.5 QUALITY ASSURANCE
- A. Codes and Standards: copy with the applicable portions of the following:
 - 1. Maine Building Code: Section 1024: Luminous Egress Path Markings
 - 2. ASTM E 2072, Standard Specification for Photoluminescent (Phosphorescent) Safety Markings.
 - 3. ASTM E 2073, Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings.
 - B. Installer's Qualifications: Installer: Firm with not less than three (3) years of successful experience in the installation of exit pathway markings similar to those required by this project and acceptable to the manufacturer of the system.
 - C. Source limitations: Obtain photoluminescent exit pathway marking products through one source from a single manufacturer.
- 1.6 DELIVERY, STORAGE AND HANDLING
- A. Store products in manufacturer's unopened packaging until ready for installation.
 - B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT/SITE CONDITIONS

- A. Field Measurements: Verify field measurements before preparation of Shop Drawings and before fabrication to ensure proper fitting. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.8 WARRANTY

- A. Provide manufacturer's written warranty stating that the photoluminescent exit path markings and associated and accessories will be free of defects in workmanship and materials in accordance with the General Conditions, except the warranty period is to be for three (3) years instead of one (1) year.
- B. Provide signed warranty and submit copies to the Architect.
- C. The above warranties are in addition to, and not a limitation of, other rights the Owner may under the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with the requirements, provide products by the following:
 - 1. Everglow NA, Inc., Mathews, NC 28106

2.2 MATERIALS

- A. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions
- B. Photoluminescent: Phosphorescent pigment, combined with a carrier/fixer that is cross-linked to an aluminum substrate at high temperature. Conforming to the following requirements:
 - 1. UL 1994: Pass
 - 2. ASTM E 2072, as modified by IBC Section 1024
 - 3. UV Degradation: 2000 hours when tested in accordance with ASTM G155.
 - 4. Salt Spray resistance: ASTM B117.
 - 5. Cleaning Test: ASTM D4820, pass.
 - 6. Rate of Burning: ASTM D635, comply.
 - 7. Surface Flammability: ASTM E162
 - 8. Toxicity Testing: Bombardier SMP800-C "Toxic Gas Generation Test".
 - 9. Radioactivity Test: ASTM D3648.
- C. Abrasive: Two (2) part Epoxy combined with aluminum oxide grit.
- D. Handrail Illumination Strips: Photoluminescent strip 1 inch wide, designed for use on and adhering to handrails with a factory applied pressure sensitive adhesive.
- E. Stair Tread and Landing Edge Nosing and Perimeter Illumination Strips: Photoluminescent strip 1 inch wide, aluminum strips with ceramic coating designed

for use on treads, landings and floor surfaces with a factory applied pressure sensitive adhesive.

- F. Wall door and hardware illumination strips: Photoluminescent strip 1 inch wide, designed for use on and adhering to walls and doors with a factory applied pressure sensitive adhesive.

2.3 ITEMS

- A. EverGlow Aluminum Guidance Strips, for use on the stair nosing and perimeter of the landings. **15.US7655**
- B. EverGlow Tamper Resistant Guidance Tape for Handrails, EXIT Discharge door frames, & Push bars. **59.US7401**
- C. EverGlow Tamper Resistant Obstacle Tape, for standpipes and obstacles in the means of egress. **59.US7416**
- D. Door Signage.
 - 1. EverGlow signs and markers, Everglow.
- E. Directional Signage.
 - 1. EverGlo signs and markers, Everglo.
- F. Epoxy Coating paint kit sample. For Stair Nosing and Perimeter of landings. **TL 300**
 - 1. Primer: As recommended by the Manufacturer.

2.4 FABRICATION

- A. Fabricate illumination strips, using phosphorescent pigment, combined with a carrier/fixer that is cross-linked to an aluminum substrate at high temperature.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine all surfaces to receive the parts of the work specified herein. Verify all dimensions of in-place and subsequent construction. Installation of photoluminescent exit path markings constitutes acceptance of existing conditions.

3.2 PREPARATION

- A. Install the photoluminescent exit path marking systems in each exit stair and in locations shown on the Drawings in accordance with the manufacturer's installation instructions and the final reviewed shop drawings, anchoring securely to supporting construction with fasteners as recommended by manufacturer.

3.3 INSTALLATION

- A. Stair Tread and Landing Nosing and Perimeter Demarcation Strips: Stair tread and landing leading edge nosing rigidly anchored to the substrate. Install the full length of each step and landing edge in accordance with the code requirements.
- B. Handrail Illumination Strips: Adhered to the handrails in accordance with the local code requirements with the factory applied pressure sensitive adhesive.
 - 1. Placed strips on the top surface of the handrail for the entire length of the handrail, including handrail extensions and newel post caps.
 - 2. At bends or corners, provide stripe as continuous as practicable with no more than a 4 inch gap in the photoluminescent strip.
- C. Demarcation Way Finding Strips shall be adhered in accordance with the established code requirements with the factory approved adhesive. Strips shall be as continuous as practicable with no more than a 4 inches gap in the photoluminescent strip.
 - 1. Floor mounted option: shall be positioned as close to the wall as practicable but no more than 4 inches away from the wall. Extend to within 2 inches of the leading edge nosing. Extend across the floor in front of obstacles. Continue across all doors except door frames marked as intermediate and final exit doors.
 - 2. Wall mounted option: Place bottom edge is no more than 4 inches above the finished floor. At the top and bottom of the stairs, demarcation lines shall drop vertically to the floor within 2 inches of the leading edge nosing. Transition demarcation vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path. Continue demarcation across all doors, or transition to the floor and extend across the floor in front of the door, except doors marked as intermediate exit doors and doors marked as final exit doors.
- D. Obstacle Markings shall be adhered to the obstruction in accordance with the established code requirements.
 - 1. Mark all obstacles at or below for 6'-6" in height and projecting more than 4" into the egress path.
- E. Door Signage shall be located and adhered in accordance with the established code requirements and placed at a maximum height from the floor of 18".
 - 1. Intermediate exit doors and final exit doors:
 - a. Intermediate exit doors are doors that lead from a vertical exit, horizontal extension in a vertical exit, horizontal exit, supplemental vertical exit, or exit passageway, but do not lead directly to the exterior or to a street level lobby.
 - b. Final exit doors are doors that lead directly to the exterior or a street level lobby.
 - c. Final exit doors are doors that lead directly to the exterior or a street level lobby.
 - d. Mount signs on the center of the door.
 - e. Door hardware shall be marked with no less than 16 square inches of photoluminescent material and the photoluminescent material shall be located behind, immediately adjacent to, or on the door adjacent to, or on the door handle and/or escutcheon. Panic bars shall have a minimum

- 1" x 16" photoluminescent strip along their entire length. The strip shall be mounted adjacent to the panic bar but not impede its operation.
- f. The top and sides of the door frames shall be marked with a solid and continuous 1" wide photoluminescent strip with a factory approved adhesive. Strip is permitted to be installed on the wall surrounding the door frame

3.4 CLEANING AND PROTECTION

- A. Clean exposed surfaces as recommended by the manufacturer.
- B. Protect installed product from damage during final construction phase. Do not allow heavy objects to come in contact with the installed products.

END OF SECTION

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SECTION 10 77 36

WINDSOCK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes roof-mounted windsock
- B. Sustainable design requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 07 62 00 "Sheet Metal Flashing and Trim" for counterflashing flashing at roof-mounted windsock poles.
 - 4. Division 26 Section for Lightning Protection for Structures for connecting roof-mounted metal windsock poles to lightning protection system.
 - 5. Division 26 Section for electrical power to windsock lighting.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for windsock poles.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- C. Shop Drawings: For windsock assemblies including poles, including plans, elevations, details, and attachments to other work. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support. Include details of roof-mounted connections and mountings.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Delegated-Design Submittal: For windsock support. Include loads, point reactions, and locations for attachment of windsock poles to building's structure.
- 1.3 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For windsocks to include in operation and maintenance manuals.
- 1.4 COORDINATION
- A. Coordinate installation of anchorages for windsock support. Furnish setting drawings, templates, and directions for installing anchorages that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain windsock, frame and pole as complete units, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design windsock pole assemblies.
- B. Seismic Performance: Windsock assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- C. Structural Performance: Windsock assemblies, including anchorages and supports, shall withstand design loads indicated within limits and under conditions indicated.
 - 1. Wind Loads: Determine according to NAAMM FP 1001. Basic wind speed for Project location is indicated on the Drawings.
 - 2. Base windsock pole design on windsock and frame indicated.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. FAA Standards: L-807 & L-807(L) AC 150/5345-27 (Current Edition) and the FAA Engineering Brief No.67. ETL Certified.

2.3 WINDSOCK

- A. Manufacturer: Subject to compliance with the requirements, provide ABD Airfield solutions.
- B. Windsock: WC807; L807-S1-IN-120-ON-5
 - 1. Material: 420 Denier Nylon with Urethane Coating.
 - 2. Size: 18 inches by 96 inches, unless otherwise indicated.
 - 3. Color: As selected by the Architect, from manufacturer's standard Orange, White, or Orange/White striped.
 - 4. Grommets: Brass.
- C. Windsock Frame:
 - 1. Powder-coated, Ball Bearing Windsock Frame, led internal light.
- D. Light: Internal LED.
 - 1. Voltage: 108-132 VAC.
 - 2. Watts: 19.
- E. Obstruction Light: LED.
- F. Windsock Pole:
 - 1. Materials: Welded steel construction hinged, with baseplate.
 - 2. Pole: Center-hinged with 4" diameter steel on the bottom and 3" diameter steel on the top.
 - 3. Pole height: As indicated on the Drawings.

2.4 MISCELLANEOUS MATERIALS

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WINDSOCK INSTALLATION

- A. General: Install windsocks where shown and according to Shop Drawings and manufacturer's written instructions.
- B. Baseplate: Install baseplate on washers placed over leveling nuts on bolts, and adjust until windsock pole is plumb. After windsock pole is plumb, tighten retaining nuts and fill space under baseplate solidly with nonshrink, nonmetallic grout. Finish exposed grout surfaces smooth and slope 45 degrees away from edges of baseplate.
- C. Mounting Brackets and Bases: Anchor brackets and bases securely to structural support with fasteners as indicated on Shop Drawings.

END OF SECTION

SECTION 10 81 13

BIRD CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes wire bird control devices.
- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 07 62 00 "Sheet Metal Flashings and Trim" for metal items made from sheet metal.

1.2 SYSTEM DESCRIPTION

- A. Birdwire: Hard-to-see ultra violet protected, nylon coated stainless steel wire spring-tensioned between stainless steel posts. Mounting Hardware: mounting clips and fasteners designed to securely fasten the Bird Control to architectural surfaces.
- B. Surface Cleaning System: Surface disinfectants and deodorizers to neutralize potentially hazardous bird or animal waste and prepare surface for installation.

1.3 SUBMITTALS

- A. Product Data: For each product specified, including: Planning guide, completed estimate worksheets and installation instructions.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS -

LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.

- C. Shop Drawings: Include plans, elevations, sections, details, details of installation, and attachments to other Work.
- D. Samples: For each product type required, 12 inch minimum length. Prepare samples from same material to be used for the Work.
 1. Sample of specified mounting hardware
- E. Maintenance Data: To include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 1. Installer must obtain, review and understand Manufacturer's planning guides, estimating worksheets and installation instructions.
 2. Installer must be completely familiar with the proper installation procedures for the Bird Wire Models specified.
 3. Installer must be completely familiar with the specified mounting hardware and mounting hardware installation procedures.
- B. Preinstallation Conference: Conduct conference at Project site to comply with Division 1 Section "Project Management and Coordination."

1.5 DELIVERY STORAGE AND HANDLING

- A. Provide storage to keep shipping boxes dry, clean and undamaged. Do not stack or place other packaging on the shipping boxes.
- B. Keep Premium Bird Control Strips and Mounting Hardware in original packaging until needed for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products by the following:
1. Bird Barrier America, Inc.
20925 Chico Street
Carson, CA 90746
Phone (310) 527-8000, (800) 503-5444
East Coast: (800) NO BIRDS (662-4737)
Fax (310) 527-8005
E-mail: bbsales@birdbarrier.com
Web: www.birdbarrier.com

2.2 PRODUCTS

- A. Birdwire:
1. Manufacturer/Product: Bird Barrier America, Inc., Birdwire. For exposed ledges where birds loaf but do not nest, to prevent loafing and damage from droppings. Bird Barrier's Birdwire is run in long sections along the length of the ledge, pipe, gutter or other mounting surface. Bird Posts are mounted to the building by attaching stick-on bases with Bird Barrier Super Bond. The posts should be placed no more than 5 feet apart. Ledges of 1 to 2 inches wide require only one row of Birdwire. Wider ledges, however, will require a row every two and a half inches. A 9 inch ledge, for example, would require 3 rows for total protection.
 2. Additional Accepted Product: Nixalite of America Inc., FliteLine® Post and Wire Bird Deterrent
 - a. Birdwire posts, springs, brackets, clamps
 - b. Material: 316 Stainless Steel
 - c. Height: Rods available 3.5", 4.5", 5.5", 6.5" and 8"
 - d. Birdwire: 325 ft, 975 ft, 1625 ft.
 3. Mounting Systems:
 - a. Steel, sheet metal, or concrete, stone or brick with no holes in substrate: Use Birdwire stick-on bases and Bird Barrier Super Bond.

2.3 SURFACE CLEANING SYSTEM

- A. Clean surfaces with system recommended by the Manufacturer of the bird control devices for the conditions encountered.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Visually inspect all installation surfaces. Make sure all surfaces are clean, dry and free from debris or other conditions that could impede the workflow of this section.
- B. Notify architect of detrimental conditions. Do not proceed until these conditions have been corrected.

3.2 PREPARATION

- A. Field Measurements: Verify dimensions of each installation surface. Use Manufacturer's Planning Guidelines and Estimate Worksheets to make sure you have sufficient quantity of bird control to properly protect the specified surfaces.
- B. Make sure all installation surface finishing requirements have been accomplished before installing Bird Control. Bird Control is to be last item installed on specified surfaces. DO NOT apply any surface coating or treatment (paint, sealer, etc.) over the installed Bird Control or mounting hardware.
- C. Remove or relocate all plants or foliage that overhangs the installation surfaces.

3.3 SURFACE CLEANING

- A. All surfaces to be clean, dry and free of obstructions before bird control is installed.
- B. If bird waste is present:
Treat, neutralize and safely remove all bird waste from installation surfaces. Installer must follow all city, state and federal regulations regarding the proper removal and disposal of bird droppings.
- C. Use Manufacturer's surface cleaning products to neutralize any bird droppings, nests and related waste materials that may be present. Allow all surfaces to air dry completely, and then reapply to sanitize and deodorize the surface before proceeding. Strictly follow treatment instructions provided with surface cleaning products.
- D. Use anti-bacterial personal protection products to help prevent disease transmittal when working around surfaces contaminated with bird droppings.

3.4 INSTALLATION

- A. Install bird control where indicated on the Drawings.
- B. Install Bird control devices in strict accordance with manufacturer's strip spacing and installation guidelines. Protect all surfaces.
 - 1. Protect the entire surface, not just the outside edges. NO GAPS allowed in the coverage.
 - 2. Fasten Bird Control to the surface with the mounting hardware recommended by the manufacturer. Follow hardware spacing guidelines and installation procedures supplied by manufacturer.

3.5 ADJUSTMENTS / CLEANING

- A. Remove debris and waste materials from project site.
- B. Inspect finished installation. Make any adjustments needed to conform to Manufacturer's spacing and installation guidelines.
- C. Visually inspect the Birdwire for loose wires or other problems related to poor installation or surface preparation.

- D. Repair as necessary immediately.

END OF SECTION

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SECTION 11 24 29

FACILITY FALL PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes, but is not limited to, design and furnishing horizontal lifeline system, including fasteners and appurtenances as required or necessary for complete installation.
- B. Products Furnished But Not Installed Under This Section: Harness: manufacturer's standard full body harness with double lanyard and shock absorbers.
- C. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- D. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. Design Requirements: Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
 - 1. Employ registered professional engineer, licensed to practice structural engineering in jurisdiction where Project is located, to engineer each component of horizontal lifeline system.
 - 2. Comply with ANSI A39.1, A120.1, and OSHA 1910.28 and 1910.66.
- B. Structural Requirements: End, corner, and intermediate supports to which a horizontal lifeline is attached and the structure to which they are attached are designed to resist 2 times the reactions (obtained by analysis) generated by the horizontal lifeline system.

1.3 ACTION SUBMITTALS

- A. Product Data: Include major equipment items.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
- C. Shop Drawings: Stamp shop drawings with seal and signature of professional engineer responsible for design.
 - 1. Submit plans, sections, elevations and details showing sizes, arrangements, materials, thicknesses, finishes, dimensions and other data to clearly explain character and nature of proposed equipment.
 - 2. Include location diagrams for inserts, and other items to be built into structure.
 - 3. Submit sequence drawings to illustrate access of building roof; show intended operations can be accomplished in safe and unencumbered manner in conformance with codes and regulations having jurisdiction.
 - 4. Verify Project conditions affecting work of this Section and obtain accurate measurements for incorporation into shop drawings.
 - 5. Indicate all necessary restrictive and non-restrictive working usage notes and general safety notes.
 - 6. Design Requirements: Include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the structural engineer who was responsible for their preparation.
 - a. Submittal will be reviewed by the Architect for general compliance with the contract documents. The Architect will not apply action stamp and will return calculation data for information.
 - 7. Calculation and shop drawings to be submitted simultaneously.

1.4 INFORMATIONAL SUBMITTALS

- A. Informational Submittals: Submit following packaged separately from other submittals:
 - 1. Test Reports: Field test reports signed by independent testing laboratory, verifying compliance with specified and regulatory requirements.
 - 2. Certifications specified in Quality Assurance article.
 - 3. Qualification Data: Manufacturer's, engineer's, and installer's qualification data.
 - 4. Certificates: Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article
- B. Submit 2 copies of a reduced plastic laminated as-built shop drawing showing equipment locations and details. This drawing is to be posted near exits onto the roof.
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, licensed to practice within the State of Maine, responsible for their preparation.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide fall protection components and systems from same manufacturer or approved by manufacturer.
- B. Engineer Qualifications: Registered professional engineer licensed to practice structural engineering in the State of Maine, with minimum of five years experience in design of fall protection systems.
- C. Manufacturer's Qualifications: Firm solely involved in design, manufacture, and installation of roof fall protection systems, that has been actively engaged in this business for not less than 10 years.
 - 1. Submit evidence when requested, indicating that firm has successfully installed at least three fall protection systems similar type as proposed for use on this Project. Include one installation not less than five years old.
 - 2. Submit with proposal, concept drawing which demonstrates manufacturer's proposed solution to building requirements showing aspects that may deviate from Drawings and Specifications. Show coordination with building structure, intermittent stabilization locations, layout, plumbing requirements, electrical requirements, and loads imposed on building structure along with description of proposed system operation.
- D. Installer Qualifications: Installer employed by manufacturer or approved in writing by manufacturer.
- E. Welder Qualifications: AWS certified within past 12 months for each type of weld required.
- F. Regulatory Requirements:
 - 1. Comply with federal, state and local codes, ordinances, and requirements pertaining to work of this Section.

2. Where requirements of governing codes, regulations, laws and rules conflict with these Specifications and are mandatory, comply with regulatory requirements.

- G. Certifications: Submit following:
 1. Engineering certifications.

1.6 PRE-INSTALLATION CONFERENCE

- A. Conduct pre-installation conference at the project site.
 1. Plan necessary coordination with structural, roofing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Shop fabricate fall protection equipment. Deliver to Project properly packaged and crated to prevent damage during transit and handling.
- B. Store materials under cover in dry, clean location, off ground. Remove materials which are damaged or otherwise not suitable for installation from Project and replace with acceptable materials.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 1. Provide allowance for trimming and fitting at site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Xenon Fall Arrest System as manufactured by Honeywell Safety Products USA, Inc..

2.2 MATERIALS

- A. Metals:
 1. Structural Steel Shapes, Bars and Plates: ASTM A36.
 2. Steel Tubing: ASTM A519.
 3. Stainless Steel Components: ASTM A666, Type 304 or 316.
- B. Hollow steel section (HSS) pier supports: galvanized mild steel as above with yield strength of 50 Ksi (350 MPa). Wall thickness to suit application.

- C. Base plate and all other sections: galvanized mild steel as above with yield strength of 44 Ksi (300 MPa). Thickness and securement to suit application.
- D. Securement bolts: mild steel, Type 300W with yield strength of 44 Ksi (300 MPa), hot dipped galvanized to ASTM A123/A 123M-2000.
- E. Safety U-bars: mild steel, Type 300W with yield strength of 44 Ksi (300 MPa), hot-dip galvanized to ASTM A123/A 123M-2000. U-bar to be not less than 3/4" (19 mm) diameter material with 1-1/2" (38 mm) eye opening.
- F. Miscellaneous bolts, nuts and washers: mild steel, Type 300W with yield strength of 44 Ksi (300 MPa), hot-dip galvanized to ASTM A123/A 123M-2000 or Type 304 stainless steel with yield strength of 35 Ksi (240 MPa).
- G. Non-Shrink Grout: Non-shrink, non-ferrous, equivalent to Masterflow 713 by Master Builders, Cleveland, OH.

2.3 FALL PROTECTION ASSEMBLIES

- A. System to consist of:
 - 1. The Fall Arrest System shall consist of a stainless steel safety cable attached to the structure with anchors at ends and intermediates points as required to meet the performance requirements. The cable shall be continuous or shall have swaged splices, which allow the user to pass without unhooking from the system.
 - 2. The cable shall have stainless steel swaged end, swaged to the cable, at each end of the cable.
 - 3. A Multifunction Absorber will be provided at one or both ends, if required by system analysis. Provide steel end brackets or Dee Anchors to attach the cable to the structure.
 - 4. Support cable (not to exceed 35 foot maximum intervals) with stainless steel Universal Intermediate Brackets designed to allow the user to pass without unhooking from the cable.
 - 5. Provide Automatic Pass-Through Shuttle(s). The Shuttle shall be able to be hooked and unhooked at any point on the cable and be able to pass the Universal Intermediate Brackets and splices without having to be detached. The Shuttle shall have a double locking mechanism that is designed for opening with one hand.
 - a. Quantity per line: 3 each section of support cable.
- B. Lanyards: Provide tear out shock absorbing lanyard(s) or self-retracting lanyard(s), having a maximum arresting force of 900 lbs., with double locking snap assemblies at each end meeting OSHA regulations and ANSI A10.32 and as recommended by the fall protection system supplier.
 - 1. Quantity: 6.
- C. Support Harness(es): Provide nylon or polyester full body harness(es) with back "D" ring meeting OSHA regulations and ANSI A10.32 and as recommended by the fall protection system supplier.
 - 1. Quantity: 6.

2.4 FABRICATION

A. General:

1. Fabricate work true to dimension, square, plumb, level and free from distortion or defects detrimental to appearance and performance.
2. Grind off surplus welding material and ensure exposed internal corners have smooth lines.

PART 3 - EXECUTION

3.1 EXAMINATION

- #### A. Site Verification of Conditions:
- Examine the areas to receive the Work and the conditions under which the Work would be performed. Contractor shall remedy conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- #### A. Coordinate and Furnish:
- Anchorage, setting drawings, diagrams, templates, instructions, and directions for installation of items having integral anchors embedded in concrete or masonry construction. Coordinate delivery of such items to the project site.

3.3 INSTALLATION

- #### A. General:
- Install system in accordance with manufacturer's printed installation instructions, submittals, applicable industry standards, and governing regulatory requirements for the Work.
- #### B.
- Fall protection system shall be installed under the direction of manufacturer's authorized trained personnel.
- #### C.
- Install anchorages and fasteners in accordance with manufacturer's recommendations to obtain the allowable working loads published in the product literature and in accordance with this specification. Do not load or stress fall protection system until all materials and fasteners are properly installed and ready for service.
- #### D.
- Co-ordinate installation with work of related trades.
- #### E.
- Install all work true, level, tightly fitted and flush with adjacent surfaces as required.
- #### F.
- Deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal or vandalism.

3.4 ADJUSTING AND INSPECTION

- #### A.
- Adjust and leave equipment in proper working order.

- B. Complete "Initial Inspection - Certification for Use" form included in Equipment Manual & Inspection Log Book.

3.5 FIELD QUALITY CONTROL

- A. Tests and Inspections:
- B. Manufacturer's Factory Trained Representative: After completion of installation, conduct full load and operation tests in accord with applicable standards under maximum design loading conditions and operate over full range (horizontally and vertically) of building surfaces to be maintained.
- C. After the safety system is installed and properly tensioned, the safety system manufacturer's approved authorized representative shall inspect and operate the system and shall make all final adjustments for proper operation.
- D. After the system has been placed into operation, the manufacturer's authorized representative shall issue a certificate attesting to the system's design and installation.
- E. Additional tests and inspections may be performed:
 - 1. Inspections and tests of installation of anchors and bases permanently attached to structure will be performed by independent laboratory selected and paid by Owner.
 - 2. Perform inspections and tests in accordance with ASTM E329.
 - 3. Inspect field bolted connections in accordance with AISC requirements.
 - 4. Test 100% of anchorage systems relying upon chemical adhesive fasteners on site using load cell test apparatus in accordance with manufacturer's recommendations.
 - 5. For welding connections:
 - a. Verify welders are qualified in accordance with American Welding Society requirements.
 - b. Perform visual inspection of welds.
 - c. Perform ultrasonic inspection of full penetration welds.
 - d. Record types and locations of defects and work performed to correct defects.
 - 6. Obtain local and state inspections and permits. Make tests as required for regulations of authorities having jurisdiction.
 - 7. Conduct tests as required by regulation of state and local authorities having jurisdiction.

3.6 ADJUSTING

- A. Complete inspection log book to certify system for use.
- B. When necessary, make minor adjustments. Carefully document and submit adjustments to Owner.

3.7 CLEANING

- A. At the end of each work day, remove unused materials, debris and containers from the site.

- B. Upon completion of the Work, remove unused materials, debris, containers and equipment from the project site. In addition to the initial cleaning procedure required, and not more than two days before occupancy by the Owner, clean the Work as recommended by the manufacturer.

3.8 DEMONSTRATION AND TRAINING

- A. Train owner's designated rigging employees in the proper use of the fall protection system.
- B. Train owner's designated rigging employees in the proper techniques of rescue and retrieval of fallen personnel.
- C. Demonstration and Instruction of Owner's Personnel: Provide in accordance with Section 01 79 00.
 - 1. Manufacturer's Factory Trained Representative: Instruct Owner's designated personnel in complete operation and maintenance of installed system.

END OF SECTION

SECTION 11 31 00

APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Appliances as scheduled on the Drawings.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
3. Division 22 Sections, requirements for Plumbing Installations.
4. Division 23 Sections, requirements for HVAC Installations.
5. Division 26 Sections, requirements for Electrical Installations.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard size.
- D. Product Schedule: For appliances. Use same designations indicated on Drawings.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Product Certificates: For each type of appliance.
 - B. Field quality-control reports.
 - C. Sample Warranties: For manufacturers' special warranties.
- 1.4 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.
- 1.5 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Maintains, within 50 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
 - B. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.

- C. Source Limitations: Obtain each type of residential appliance from single manufacturer.
- D. Propane Conversion: Provide gas-operated appliances with manufacturer's conversion kit installed by a qualified service agency according to manufacturer's written instructions for Project location and type of fuel.
- E. Regulatory Requirements: Comply with the following:
 - 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. ANSI: Provide gas-burning appliances that comply with ANSI Z21 Series standards.
- F. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- G. Preinstallation Conference: Conduct conference at Project site.

1.6 COORDINATION

- A. Coordinate the Building construction with appliances provided by the Owner. Assure that casework allows space for appliances without excessive clearances.
- B. Verify that Mechanical and Electrical systems are properly configured to provide services to each appliance.

1.7 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
- B. Refrigerator/Freezer, Sealed System: Full warranty including parts and labor for on-site service on the product.
 - 1. Warranty Period for Sealed Refrigeration System: Five years from date of Substantial Completion.
 - 2. Warranty Period for Other Components: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain residential appliances from single source and each type of residential appliance from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Appliances: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design the ABA standards of the Federal agency having jurisdiction and ICC A117.1.

2.3 APPLIANCES

- A. As scheduled in the Drawings.

2.4 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install appliances according to manufacturer's written instructions.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

- D. Range Anti-Tip Device: Install at each range according to manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.
 - 2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After installation, start units to confirm proper operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
- C. An appliance will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.4 CLEANING AND PROTECTION

- A. Test each item to verify proper operation. Make necessary adjustments.
- B. Verify that accessories required have been furnished and installed.
- C. Remove packing material from appliances and leave units in clean condition, ready for operation.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances.

END OF SECTION

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SECTION 11 70 05
MEDICAL EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Owner furnished medical equipment installed by the Contractor.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Requirements:

1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Division 22 Sections, requirements for Plumbing Installations.
5. Division 26 Sections, requirements for Electrical Installations.

1.2 OWNER-FURNISHED ITEMS

A. The Owner will provide indicated equipment for the project.

1. The Owner will arrange and pay for delivery of Owner-furnished items in accordance with the Contractor's Construction Schedule. The Owner will inspect deliveries for damage.
2. If Owner-furnished items are damaged, defective or missing, the Owner will arrange for replacement. The Owner will arrange for manufacturer's field services, and obtain manufacturer's warranties.

B. Schedule:

1. The Contractor shall establish the delivery dates of Owner-furnished items in the Contractor's Construction Schedule, and, unless otherwise noted, shall be responsible for receiving, unloading, uncrating and handling Owner-furnished items at the site. The Contractor shall protect Owner-furnished items from damage as a result of his operations.

2. The Owner's equipment vendors shall notify the Contractor 48 hours, but not less than two working days, prior to delivery dates, and advise on equipment required for unloading and handling.

1.3 ACTION SUBMITTALS

- A. Product data: For each type of product.
 1. Owner will Submit complete list of materials plus manufacturer's brochures, data sheets and product manuals indicating sizes, anchorage methods, desired clearances and utility locations for component specified in this Section.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Owner will Shop drawings for equipment requiring coordination with other portions of the Work. Show sizes, included items, fastening methods, and mounting techniques. Indicate type, size, and location of backing material for installation by other portions of this Work. Provide installation drawings indicating rough-ins for

plumbing, wiring, piping, ventilating and service requirements. Provide detailed utility service requirements, including peak & nominal utility usage profiles.

1. Include plans, elevations, sections, and attachment details.
2. Indicate details for anchoring laboratory equipment to permanent building construction including locations of blocking and other supports.
3. Indicate locations and types of service fittings together with associated service supply connection required.
4. Indicate duct connections, electrical connections, and locations of access panels.
5. Include roughing-in information for mechanical, plumbing, and electrical connections.
6. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from the above items.
7. Include layout of laboratory equipment extending to within 24 inches of the ceiling in relation to lighting fixtures and air-conditioning registers and grilles.
8. Include coordinated dimensions for medical equipment specified in other Sections.
9. Include coordinated dimensions and service requirements for Owner furnished medical equipment. (Obtain from the Owner.)

- D. Owner will Samples for verification: For selections made by the Architect, in Manufacturer's standard size.

1.4 INFORMATIONAL SUBMITTALS

- A. Owner will supply Product Test Reports: Showing compliance with specified performance requirements for as-manufactured equipment, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency
- B. Quality Assurance documents:
1. Written verification that equipment is: installed per applicable and referenced codes and standards; adjusted and balanced per manufacturer's design operations and specifications; and is complete and ready for intended function.
- C. Owner will provide Operations and Maintenance Manuals for each equipment type/model that describe operating procedures, maintenance (including tear down), replacement schedules, components parts list, and nearest local factory representative (include phone number) for components and emergency repairs.
- D. Certificates of Compliance
- E. Submittals shall include weights, dimensions, center of gravity, standard connections, manufacturer's recommendations and behavior problems (e.g., vibration, thermal expansion,) associated with equipment or piping so that the proposed installation can be properly reviewed.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are listed in the text by the basic designation only.
- B. International Organization for Standardization (IOS):
10535-06 Hoist for the Transfer of Disabled Persons-Requirements
and Test Methods
- C. Underwriters Laboratories (UL):
60601-1 Medical Electrical Equipment: General Requirements for
Safety
94-2006 UL Standards for Safety Test for Flammability of Plastic
Materials for Parts in Devices and Appliances-Fifth
Edition
- D. International Electromagnetic Commission (IEC):
801-2(1991) Electromagnetic Compatibility for Industrial-Process
Measurement and Control Equipment-Part 2:
Electromagnetic Discharge Requirements

1.6 QUALITY ASSURANCE

- A. For fabrication and installation of Work, use personnel who are trained and experienced with the specified equipment and with the required number of apprentices.
- B. Equipment may be inspected by the Owner or Architect at the manufacturer's plant prior to shipment. Equipment found not to be in accordance with requirements of Contract Documents will be rejected. Rejected equipment must be corrected or replaced at no change in Contract amount.
- C. Certification for compliance is required for Ceiling Mounted Patient Lift Systems. Certifications shall be provided by an independent third party who will conduct testing to ensure that the ceiling lift and charging system are safe and in compliance with ISO 10535 & UL 60601-1
- D. Mockups: Provide equipment for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 - 1. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring medical equipment.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Products are as indicated in the "MITCHELL PLANNING, MAINE MEDICAL CENTER EQUIPMENT REPORT BY DEPARTMENT," and "MAINE MEDICAL CENTER Medical Equipment Cutbook" by Mitchell Associates, dated 09/11/2017. The Documents are attached following this Specification Section.

PART 3 - EXECUTION

3.1 EQUIPMENT RESPONSIBILITIES

- A. Owner Furnished and Contractor Installed (OFCI): Items are furnished by the Owner and installed by the Contractor. Items are limited to Owner Furnished and Contractor Installed items designated in the "Phase 8 Medical Equipment Schedule + Specifications." Additional equipment items and products are shown on the Drawings and specified in other Specification Sections. Equipment not identified in the "Phase 8 Medical Equipment Schedule + Specifications" are Contractor Furnished and Contractor Installed.

3.2 INSTALLATION

- A. Install ceiling mounted systems as per manufacturer's instruction and under the supervision of manufacturer's qualified representative and as shown on drawings.
- B. Anchoring to In-Place Construction: Use anchors and fasteners where necessary to secure built-in and permanently placed equipment to structural support and to properly transfer load to in-place construction.

3.3 INSTRUCTION AND PERSONNEL TRAINING

- A. Training shall be provided for the required personnel to educate them on proper operation and maintenance for the lift system equipment.

3.4 TEST

- A. Conduct performance test, in the presence of the Resident Engineer and a manufacturer's field representative, to show that the patient lift system equipment and control devices operate properly and in accordance with design and specification requirements.

3.5 CLEANING AND PROTECTION

- A. Clean all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.
- B. Protect medical equipment against damage during remainder of construction period, complying with the equipment manufacturer's directions

- C. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.

3.6 ATTACHMENTS

- A. The attached medical equipment list and cutsheets are basis of design information. The contractor shall coordinate with actual procured items per the Action Submittals, Shop Drawings, and Informational Submittals.
 - 1. "MITCHELL PLANNING, MAINE MEDICAL CENTER EQUIPMENT REPORT BY DEPARTMENT," dated 10/4/2017.
 - 2. "MAINE MEDICAL CENTER Medical Equipment Cutbook" by Mitchell Associates, dated 10/4/2017.

END OF SECTION



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

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DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: CORRIDOR
ROOM NUMBER: 6004

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	093412 MVD01	4	MONITOR, VIDEO MXU0299: DISPLAY FLAT PANEL NON-TOUCH PIIC SPACE: SPACE	PHILIPS MEDICAL SYSTEMS MXU0299 866390	N	OF/OI
2	093331 WCH01	4	WALL CHANNEL WALL CHANNEL;SEISMIC;19" SPACE: WALL	PHILIPS MEDICAL SYSTEMS MXU175	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT CARE STATION (QTY 5)
ROOM NUMBER: 6005

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	087769 MON01	1	MONITOR, CENTRAL STATION PIIC IX SURVEILLANCE CENTRAL MONITORING;19" TOUCH (WxDxH) :48x16x16 SPACE: COUNTER CM:121.9x40.6x40.6 ELECT: CPU: 115 VAC;60 HZ;5.2 AMPS LCD DISPLAY: 115 VAC;60 HZ;48W TYP. UPS: 115 VAC;60 HZ;5.6 AMPS PRINTER: 117 VAC;60 HZ;5.3 AMPS HVAC: MUST MAINTAIN TEMP AT 62-82 DEGREES F AND NON-CONDENSING RELATIVE HUMIDITY AT 30-60% CPU: 215 BTU/HR UPS: 437 BTU/HR (MAX) DATA CONNECTION REQUIRED, SEE TECH SHEET	PHILIPS MEDICAL SYSTEMS INTELLIVUE INFO CENTER IX	N	OF/OI
2	504528 MON17	1	ALLOWANCE, MONITORING, TELEMETRY	ZZZ - MONITORING	N	OF/OI
3	086723 ANA01	3	LAB ANALYZER, GLUCOSE BLOOD GLUCOSE & KETONE MONITORING;BARCODE READER (WxDxH) :3x2x8 LBS: 1 SPACE: SPACE CM:7.6x5.1x20.3 KG: 0.50 ELECT: 2 AA BATTERIES (ALKALINE, LITHIUM, OR NICAD)	ABBOTT DIAGNOSTICS 71411-70 PRECISION PRO	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, EQUIPMENT (QTY 2)
ROOM NUMBER: 6011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	006264	1	NOTE:	ZZZ - NOTE: (U.S.)	I	OF/OI
			- NEED TO CONFIRM EXISTING			
2	079188 SHV01	2	SHELVING, WIRE 5 SHELVES;STATIONARY;CHROME;SHELF INLAY (WxDxH) :24x24x74 SPACE: FLOOR CM:61.0x61.0x188.0	INTERMETRO INDUSTRIES CORP. A2424NC/74P A2424NC	I	OF/VI
			- NEED TO CONFIRM EXISTING			
3	002532 CRT06	1	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	I	OF/OI
			- NEED TO CONFIRM EXISTING			
4	058498	2	SPHYGMOMANOMETER, ANEROID, MOBILE 5 LEG STAND;CERTIFIED ACCURATE TO 3MMHG;LATEX (WxDxH) :18x18x36 LBS: 12 SPACE: FLOOR CM:45.7x45.7x91.4 KG: 5.50	WELCH ALLYN, INC. 7670-03	I	OF/OI
			- NEED TO CONFIRM EXISTING			
5	072678 DOP01	2	DOPPLER, FLOW DETECTOR NON-DIRECTIONAL POCKET DOPPLER W/BUILT-IN (WxDxH) :18x18x36 LBS: 2 SPACE: FLOOR CM:45.7x45.7x91.4 KG: 0.90	HUNTLEIGH HEALTHCARE D900-P-USA/EZ8 D900 DOPPLEX	I	OF/OI
			ELECT: 9V ALKALINE BATTERY - NEED TO CONFIRM EXISTING			



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, EQUIPMENT (QTY 2)
ROOM NUMBER: 6011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
6	086490	1	OPHTHALMOSCOPE/OTOSCOPE MOBILE STAND; PANOPTIC OPHTHALMOSCOPE;MACROVIEW (WxDxH) :22x22x54 SPACE: FLOOR CM:55.9x55.9x137.2 ELECT: 100-240V;50/60HZ;.18 AMPS MAX - NEED TO CONFIRM EXISTING	WELCH ALLYN, INC. 77710-82M/ACC GS 777 SERIES	I	OF/OI
7	067194	4	I.V. POLE STAINLESS STEEL;5 LEG;3 IN CASTERS;4 HOOK TOP (WxDxH) :23x6x35 LBS: 32 SPACE: FLOOR CM:58.4x15.2x88.9 KG: 14.50 - NEED TO CONFIRM EXISTING	PRYOR PRODUCTS 135	I	OF/OI
8	088643	4	I.V. INFUSION PUMP GENERAL INFUSION PUMP;SINGLE CHANNEL;POLE CLAMP; (WxDxH) :8x8x6 LBS: 10 SPACE: SPACE CM:20.3x20.3x15.2 KG: 4.50 ELECT: 120V;50/60HZ;35W;1A;1 RECHARGEABLE BATTERY LEAD-ACID 6V;POWER CORD:HOSPITAL-GRADE AC CORD 10 FT LONG W/TRANSPARENT PLUG AND RETAINER PLATE - NEED TO CONFIRM EXISTING	HOSPIRA, INC. 30010 PLUM 360/MEDNET	I	OF/OI
9	087247	4	WALKER, FOLDING, ADULT SIDE WALKER;ALUMINUM;USER WT CAP 300LBS;HT ADJUST (WxDxH) :19x16x36 LBS: 4 SPACE: FLOOR CM:48.3x40.6x91.4 KG: 1.60 - NEED TO CONFIRM EXISTING	PERFORMANCE HEALTHCARE 081561752 HEMI DAYS INVACARE	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, EQUIPMENT (QTY 2)
ROOM NUMBER: 6011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
10	066897	4	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0 - NEED TO CONFIRM EXISTING	MEDLINE INDUSTRIES, INC. MDS89668XW	I	OF/OI
11	096810 BRD01	2	BOARD, PATIENT TRANSFER 529 LB CAPACITY;FOR USE IN RADIOLOGY,SURGERY,ICU (WxDxH) :20x70x2 LBS: 8 SPACE: WALL CM:50.8x177.8x5.1 KG: 3.80 - NEED TO CONFIRM EXISTING	SAMARIT 440.0100 HIGHTEC	I	OF/OI
12	078455 BRD03	2	BOARD, PATIENT TRANSFER SURGIBOARD 47X16";TO AND FROM OR TABLE (WxDxH) :16x47x2 SPACE: WALL CM:40.6x119.4x5.1 - NEED TO CONFIRM EXISTING	MCAULEY MEDICAL INC 440.0400 SAMARIT	I	OF/OI
13	055330	1	LIFTER, PATIENT INFLATABLE;NYLON OXFORD;TESTED UPT 1100LBS (WxDxH) :39x70x30 SPACE: FLOOR CM:99.1x177.8x76.2 ELECT: 120V/60HZ/1100 WATTS;GROUNDED;14' POWER CORD - NEED TO CONFIRM EXISTING	HOVERTECH INTERNATIONAL HJ3902/AIR400G/ACC HOVERJACK	I	OF/OI
14	057580 LFT02	1	CART HOLDS HOVERJACK AIR SUPPLY AND LIFT (WxDxH) :25x18x38 LBS: 26 SPACE: FLOOR CM:63.5x45.7x96.5 KG: 11.80 - NEED TO CONFIRM EXISTING	HOVERTECH INTERNATIONAL HJC-100 HOVER JACK	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, EQUIPMENT (QTY 2)
ROOM NUMBER: 6011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
15	073144	1	TRANSILLUMINATOR VEIN LOCATOR;INFRARED LIGHT;HAND HELD;BATTERY (WxDxH) :24x24x36 SPACE: FLOOR CM:61.0x61.0x91.4 - NEED TO CONFIRM EXISTING	BODIFLOW, LLC AV300 ACCUVEIN	I	OF/OI
16	094909 CRT07	1	CART, UTILITY MULTIPURPOSE CART;800LB CAPACITY;5"WHEELS (WxDxH) :21x31x42 LBS: 44 SPACE: FLOOR CM:53.3x78.7x106.7 KG: 20.00 - NEED TO CONFIRM EXISTING	VERSACART EZTOTE 390 101-390	I	OF/OI
17	063659	4	TABLE, OVERBED SINGLE TOP;W/VANITY;LOW PROFILE U-SHAPED BASE (WxDxH) :21x32x45 LBS: 53 SPACE: FLOOR CM:53.3x81.3x114.3 KG: 24.10 SPECIFY FINISH SPECIFY FINISH: BASE SPECIFY FINISH: EDGE - NEED TO CONFIRM EXISTING	STRYKER CORP/MEDICAL DIV 3150-000-200 TRU-FIT	I	OF/OI
18	082590	2	WALKER 4-WHEEL WALKER;8" NON-MARRING CASTERS;300LB CAP (WxDxH) :24x26x37 LBS: 20 SPACE: FLOOR CM:61.0x66.0x94.0 KG: 9.10 - NEED TO CONFIRM EXISTING	PERFORMANCE HEALTHCARE 081576974 ROLLATOR WALKER	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, EQUIPMENT (QTY 2)
ROOM NUMBER: 6011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
19	091438	1	CHAIR, SHOWER 500LB USER WT CAP;14-19" HT ADJ SEAT;W/KNOCK DOWN (WxDxH) :18x20x30 LBS: 8 SPACE: FLOOR CM:45.7x50.8x76.2 KG: 3.40 - NEED TO CONFIRM EXISTING	DRIVE MEDICAL 12021KD-1 DELUXE BARI	I	OF/OI
20	070331 SCL01	2	SCALE, STAND-ON PORTABLE;DIGITAL READOUT;HANDRAIL/HEIGHT GAUGE (WxDxH) :26x26x78 LBS: 62 SPACE: FLOOR CM:66.0x66.0x198.1 KG: 28.10 ELECT: 120V; 6-D BATTERIES - NEED TO CONFIRM EXISTING	SCALE-TRONIX DIV. OF WELCH ALLYN 5002/845010/845233	I	OF/OI
21	046403 IMU01	2	IMAGING, ULTRASOUND SCANNER BLADDER ULTRASOUND SCANNER; W/ROLLING CART (WxDxH) :15x15x30 LBS: 20 SPACE: FLOOR CM:38.1x38.1x76.2 KG: 9.10 ELECT: BATTERY CHARGER:100-120V;60HZ;INPUT CURRENT 0.39A 7.2V NIMH BATTERY PACK;STANDARD ELECTRIC OUTLET - NEED TO CONFIRM EXISTING	VERATHON MEDICAL BVI3000 BLADDERSCAN	I	OF/OI
22	094399 IMU02	1	IMAGING, ULTRASOUND SCANNER KIOSK SYSTEM W/STAND;19" LED MONITOR;TOUCH SCREEN (WxDxH) :22x27x64 SPACE: FLOOR CM:55.9x68.6x162.6 ELECT: 100-240VAC; RECHARGEABLE LITHIUM-ION BATTERY - NEED TO CONFIRM EXISTING	SONOSITE, INC. L15600 X-PORTE	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, EQUIPMENT (QTY 2)
ROOM NUMBER: 6011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
23	050708 MON03	1	MONITOR, PHYSIOLOGICAL, TRANSPORT BIPHASIC DEFIBRILLATOR;EXTERNAL PACING;PRINTER (WxDxH) :11x9x11 LBS: 18 SPACE: SPACE CM:27.9x22.9x27.9 KG: 8.20 ELECT: 120V;60HZ; - NEED TO CONFIRM EXISTING	ZOLL MEDICAL CORPORATION 43510711100124010/AC M CCT/BIPHASIC	I	OF/OI
24	079214 MON04	1	MONITOR, PHYSIOLOGICAL, TRANSPORT TRANSPORT MONITOR WITH MMS, TO INCLUDE: (WxDxH) :13x8x12 LBS: 13 SPACE: SPACE CM:33.0x20.3x30.5 KG: 5.90 ELECT: 100-240V, 50/60HZ, 70W AVERAGE, 1.2AMP PLUMB: NO PLUMBING REQUIRED - NEED TO CONFIRM EXISTING	PHILIPS MEDICAL SYSTEMS 866060 MX400	I	OF/OI
25	082037 ECG01	1	ELECTROCARDIOGRAPH WIRELESS;15IN CLR TOUCH SCREEN;12 LEADS (WxDxH) :16x13x63 LBS: 28 SPACE: FLOOR CM:40.6x33.0x160.0 KG: 12.70 ELECT: 120 VAC;60HZ;75W MAX - NEED TO CONFIRM EXISTING	PHILIPS MEDICAL SYSTEMS PAGEWRITER TC70 806315/860318	I	OF/OI
26	078101	2	LIFTER, PATIENT, ACCESSORY, MOTOR 1000LB LIFT MOTOR, 24VDC, CEILING RAIL MOUNTED (WxDxH) :14x11x8 LBS: 25 SPACE: SPACE CM:35.6x27.9x20.3 KG: 11.10 ELECT: 24VDC, 1.5A	PRISM MEDICAL C1000 MOTOR C1000 MOTOR	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, LINEN (QTY 2)
ROOM NUMBER: 6012

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	096814 CRT03	2	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70 - PATIENT LINENS	G.S. MANUFACTURING GSM-G160 -	N	OF/OI
2	078147 CAB01	2	CABINET, WARMING MOBILE;2 COMPARTMENTS;20.6CF;GLASS DOORS;SEPARATE (WxDxH) :32x25x74 LBS: 358 SPACE: FLOOR CM:81.3x63.5x188.0 KG: 162.40 ELECT: 120V;50/60HZ;1PH;15A;1.8KW NEMA 5-20P;20A-125V PLUG HOSPITAL GRADE SPECIFY DOOR HINGE;RIGHT OR LEFT - PLACEHOLDER FOR FULL SIZE, SINGLE COMPARTMENT	PEDIGO PRODUCTS, INC. P-2055 P-2055	N	OF/OI
3	002532 CRT06	2	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	N	OF/OI

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, NUTRITION (QTY 2)
ROOM NUMBER: 6013

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	095453	2	CART, FOOD	LAKESIDE MFG. CO.	N	OF/OI
	CRT02		SS;6 TRAY CAPACITY;6"LEDGE SPACING;REMOVABLE DOOR (WxDxH) :33x22x46 LBS: 110 SPACE: FLOOR CM:83.8x55.9x116.9 KG: 49.90	SP-6373 ELITE		
			- SOILED TRAY CART			

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: SOILED
ROOM NUMBER: 6015

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	094910 COM01	1	COMPACTOR, WASTE 20:1 COMPACT RATION;COMMERCIAL;ELECTROHYDRAULIC (WxDxH) :43x31x90 LBS: 1210 SPACE: FLOOR CM:109.2x78.7x228.6 KG: 548.80 ELECT: 115V;60HZ;15 AMP;SINGLE PHASE;DEDICATED CIRCUIT - ECO-PACK	FOUNTAIN INDUSTRIES ECO-PACK 3600	N	OF/OI
2	079188 SHV01	1	SHELVING, WIRE 5 SHELVES;STATIONARY;CHROME;SHELF INLAY (WxDxH) :24x24x74 SPACE: FLOOR CM:61.0x61.0x188.0	INTERMETRO INDUSTRIES CORP. A2424NC/74P A2424NC	N	OF/OI
3	073358 TRK01	1	TRUCK/BIN, LINEN HORIZONTAL SHELVES;POLYETHYLENE;IMPACT RESISTANT (WxDxH) :48x29x64 SPACE: FLOOR CM:121.9x73.7x162.6	MEESE ORBITRON DUNNE CO. POLY TRUX 90P	N	OF/OI
4	066897	1	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0	MEDLINE INDUSTRIES, INC. MDS89668XW	N	OF/OI
5	096813	1	WASTE RECEPTACLE, STEP-ON 12 GAL;WHITE;FOOT PEDAL OPERATED;FIRE SAFE (WxDxH) :12x12x23 SPACE: FLOOR CM:30.5x30.5x58.4	RUBBERMAID COMM. PRODUCTS RCPST12ERBWHI DEFENDERS	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: SOILED
ROOM NUMBER: 6015

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
6	071200	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL 9 GALLON;CLEAR SLIDE TOP;RECYCLED PLASTIC-BLACK (WxDxH) :18x12x19 SPACE: SPACE CM:45.7x30.5x48.3 SPECIFY ACCESSORIES AS SEPARATE LINE ITEMS	BECTON DICKINSON RCRA HAZARDOUS WASTE 305069	N	OF/OI
7	070664	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL CHEMOTHERAPY;PLASTIC;18 GAL;YELLOW;SLIDING LID (WxDxH) :18x13x26 LBS: 8 SPACE: FLOOR CM:45.7x33.0x66.0 KG: 3.60	KENDALL HEALTHCARE, COVIDIEN 8939 CHEMO DISPOSAL	N	OF/OI
8	089948	1	WASTE RECEPTACLE, RECYCLING 23 GALLON;DARK BLUE;RECYCLE SYMBOL;W/ LID (WxDxH) :20x11x35 SPACE: FLOOR CM:50.8x27.9x88.9	RUBBERMAID COMM. PRODUCTS H-1385BLU SLIMJIM 3540-07	N	OF/OI
9	079178	1	WASTE RECEPTACLE CONFIDENTIAL;SIDE PAPER SLOT;KEYPAD LOCK;SHIPS (WxDxH) :11x24x25 LBS: 30 SPACE: FLOOR CM:27.9x61.0x63.5 KG: 13.60	RUBBERMAID COMM. PRODUCTS 9W25 SLIM JIM	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL

ROOM NAME: MEDICATION

ROOM NUMBER: 6016

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	072239	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/VI
	MED02		14.75"LCD MONITOR;KEYBOARD;TOUCHPAD;BIO-ID SCANNER (WxDxH) :23x27x55 LBS: 166 SPACE: FLOOR CM:58.4x68.6x139.7 KG: 75.30	MEDSTATION ES 6 DRAWER MAIN		
			ELECT: 120V;60HZ;3 AMPS MAX EMERGENCY POWER REQUIRED			
			HVAC: 409 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET - NEED TO UPDATE TO ES SERIES			
2	072241	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/OI
	MED05		SLIDE BRACKETS W/DRAWER RELEASE;PLASTIC TOP (WxDxH) :23x47x47 LBS: 133 SPACE: FLOOR CM:58.4x119.4x119.4 KG: 60.30	7 DRAWER AUXILIARY MEDSTATION ES		
			ELECT: 120V;60HZ;3 AMPS MAX;EMERGENCY POWER REQUIRED			
			HVAC: 222 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET			
3	072243	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/OI
	MED03		SINGLE COLUMN;1 STORAGE SHELF PER DOOR;INTERIOR (WxDxH) :31x28x80 LBS: 314 SPACE: FLOOR CM:78.7x71.1x203.2 KG: 142.40	FOUR DOOR AUXILIARY MEDSTATION ES		
			ELECT: 120V;60HZ;3 AMPS;EMERGENCY POWER REQUIRED			
			HVAC: 222 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET			



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: MEDICATION
ROOM NUMBER: 6016

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
4	079417 REF01	1	REFRIGERATOR, UPRIGHT, MEDICAL GRADE 115V;SINGLE DOOR;19.7 CF;SS;LED DIG. TEMP;LOCKING (WxDxH) :30x31x80 LBS: 395 SPACE: FLOOR CM:76.2x78.7x203.2 KG: 179.20 ELECT: 115V,60HZ,8.7A HVAC: 950 BTU/HR MAX HEAT REJECTION	FOLLETT CORPORATION REF20-LB-R000 REF20-LB-R000	N	OF/OI
5	053907 MED01	1	DISPENSER, MEDICATION, ACCESSORY MED DISPENSING UNIT REFRIGERATOR CONTROL (WxDxH) :3x6x7 LBS: 4 SPACE: SPACE CM:7.6x15.2x17.8 KG: 1.80 ELECT: POWERED FROM MAIN DISPENSER	BD CAREFUSION PYXIS REMOTE MANAGER MSRM	N	OF/VI
6	506535 OSS01	1	OPEN SUPPLY SYSTEM - PAREX SUPPLY SYSTEM, WEIGHT BASED -PROVIDE BACKING ON ALL WALLS WITH NO OUTLETS EXTENDING BEYOND 12" AFF. REQUIRES POWER AND DATA AT CONTROL LOCATION.	ZZZ - GENERIC DESCRIPTIONS	N	OF/VI
7	077862 BIN01	2	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 SPACE: WALL CM:91.4x2.5x48.3	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: MEDICATION
ROOM NUMBER: 6016

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
8	093412 MVD01	1	MONITOR, VIDEO MXU0299: DISPLAY FLAT PANEL NON-TOUCH PIIC SPACE: SPACE	PHILIPS MEDICAL SYSTEMS MXU0299 866390	N	OF/OI
- TO INCLUDE SPEAKERS						
9	055704 EWS01	1	ENCLOSURE, WALL, SHARPS 2 OR 5 QT WALL ENCLOSURE (WxDxH) :13x6x12 CM:33.0x15.2x30.5 SPACE: WALL	KENDALL HEALTHCARE, COVIDIEN 85161H IN-ROOM	L	OF/CI
10	093535 DSL02	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL 2GAL;BLACK;WHITE HINGED LID W/PORT;LEAK RESISTANT (WxDxH) :12x10x12 CM:30.5x25.4x30.5 SPACE: WALL	KENDALL HEALTHCARE, COVIDIEN 8602RC/8963 8602RC/8963	N	OF/OI
11	061957 GLV02	2	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 CM:45.7x10.2x22.9 SPACE: WALL	CLINTON INDUSTRIES G-1030 -	N	OF/CI
12	006677	1	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 CM:55.9x27.9x76.2 SPECIFY COLOR LBS: 43 KG: 19.50 SPACE: FLOOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: MEDICATION
ROOM NUMBER: 6016

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
13	047636	2	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60 - PLACEHOLDER FOR RED AND BLACK BINS. NEED VENDOR AND MODEL.	RUBBERMAID COMM. PRODUCTS 2544 40 QT	N	OF/OI

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: NOURISHMENT
ROOM NUMBER: 6018

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	058112 REF02	1	REFRIGERATOR/FREEZER, UPRIGHT 115V;18.2 CF;TOP FREEZER;NON-ICE;LEFT HINGE;WHITE (WxDxH) :30x32x67 LBS: 205 SPACE: FLOOR CM:76.2x81.3x170.2 KG: 93.00 ELECT: 115V;4.5A;60HZ;407 WATTS	SEARS COMMERCIAL SALES KENMORE 46-68972	N	OF/OI
2	087445 ICE01	1	ICE MAKER W/WATER DISPENSER 12# STORAGE CAP;425#/24HR;LEVER;W/O FILTER (WxDxH) :17x24x33 LBS: 199 SPACE: COUNTER CM:43.2x61.0x83.8 KG: 90.30 ELECT: 115VAC/60HZ/1PH/11A/.8KW 8.5' CORD W/NEMA 5-15 HOSPITAL GRADE PLUG HVAC: 5000 BTU/HR CLEARANCES: VENTILATION 6" TOP & RIGHT SIDES SERVICE 12" TOP PLUMB: REFER TO VENDOR TECHNICAL INFORMATION	FOLLETT CORPORATION 12CI425A-L AIR COOLED	N	OF/CI
3	080483 OVE01	1	OVEN, MICROWAVE 1000W;S.S. INTERIOR/EXTERIOR (WxDxH) :21x16x13 LBS: 37 SPACE: COUNTER CM:53.3x40.6x33.0 KG: 16.80 ELECT: 120V;14A/11;1.6KW;15AMP NEMA 15-R RECEPTACLE	SHARP ELECTRONICS CORP. R21LCF R21LCF	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: NOURISHMENT
ROOM NUMBER: 6018

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
4	062450 COF01	1	COFFEE BREWER PLUMBED;1 LOWER BREWER/2 UPPER WARMERS;200 OZ CAP. (WxDxH) :9x22x19 LBS: 30 SPACE: COUNTER CM:22.9x55.9x48.3 KG: 13.60 ELECT: 120V/15AMPS;TANK HEATER 1425W;TOTAL WATTS 1800 CORD ATTACHED;REQ.2-WIRES PLUS GROUND SERVICE RATED 120V,SINGLE PHASE,60HZ. PLUMB: 20-90 PSI (138-621 KPA).MACHINES SUPPLIED W/ 1/4" MALE FLARE FITTING - TO INCLUDE HOT WATER TAP	BUNN-O-MATIC CORP. AXIOM-15-3-0000/ACC 38700.0000	L	OF/VI
5	051789 TST01	1	TOASTER, COMMERCIAL 2-SLOT;CHROME-PLATED CONSTRUCTION;1 3/8"WIDE SLOTS (WxDxH) :14x9x9 LBS: 5 SPACE: COUNTER CM:35.6x22.9x22.9 KG: 2.30 ELECT: 120 VOLTS/8 AMPS/925 WATTS/PHASE 1	WARING PRODUCTS WCT702 -	N	OF/OI
6	094915 DSP02	1	DISPENSER, FOOD SERVICE, BEVERAGE SOFT DRINK;4 POST MIXING DISPENSING VALVES;LEG KIT (WxDxH) :11x26x28 LBS: 145 SPACE: COUNTER CM:27.9x66.0x71.1 KG: 65.80 ELECT: 120V;60HZ;7 AMPS PLUMB: SS LABELED INLET SYRUP/WATER;3/8"BARB - COORDINATION REQUIRED FOR SYRUP, CO2, ETC UNDER COUNTER	LANCER CORP. CED 500	L	OF/OI
7	061957 GLV02	1	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 SPACE: WALL CM:45.7x10.2x22.9	CLINTON INDUSTRIES G-1030 -	N	OF/CI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: NOURISHMENT
ROOM NUMBER: 6018

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
8	006677	1	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 LBS: 43 SPACE: FLOOR CM:55.9x27.9x76.2 KG: 19.50 SPECIFY COLOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, CART
ROOM NUMBER: 6022

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - IV CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	N	OF/OI
2	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - RT CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	N	OF/OI
3	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - FOR LINEN	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	N	OF/OI
4	092750 MON05	1	MONITOR, VITAL SIGNS NIBP;SPO2;TEMPERATURE;RECORDER;ADULT/PEDIATRIC/ (WxDxH) :25x25x50 LBS: 12 SPACE: FLOOR CM:63.5x63.5x127.0 KG: 5.40 ELECT: 120 VOLT/60 HZ BATTERY CHARGER 10.8-11.1V LITHIUM ION BATTERY - FOR AMBULATION	PHILIPS MEDICAL SYSTEMS 863283/989803176601 SURE SIGNS VS4	N	OF/OI

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: DICTATION
ROOM NUMBER: 6027

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	096814 CRT23	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70 - GOWN	G.S. MANUFACTURING GSM-G160 -	N	OF/OI
2	094909 CRT07	1	CART, UTILITY MULTIPURPOSE CART;800LB CAPACITY;5"WHEELS (WxDxH) :21x31x42 LBS: 44 SPACE: FLOOR CM:53.3x78.7x106.7 KG: 20.00	VERSACART EZTOTE 390 101-390	N	OF/OI

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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: CLEAN SUPPLY
ROOM NUMBER: 6028

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	506535 OSS01	1	OPEN SUPPLY SYSTEM	ZZZ - GENERIC DESCRIPTIONS	N	OF/VI
			- PAREX SUPPLY SYSTEM, WEIGHT BASED -PROVIDE BACKING ON ALL WALLS WITH NO OUTLETS EXTENDING BEYOND 12" AFF. REQUIRES POWER AND DATA AT CONTROL LOCATION.			
2	077862 BIN01	30	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 CM:91.4x2.5x48.3	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI
			SPACE: WALL			
3	084658 CRT01	5	CART, CYLINDER, MEDICAL GAS 6 CAPACITY; E/D SIZE;W/HEAVY DUTY 5" CASTERS (WxDxH) :11x16x39 CM:27.9x40.6x99.1	W.T. FARLEY, INC. CR-DC06E-G -	N	OF/OI
			LBS: 22 KG: 10.00			
			SPACE: FLOOR			

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, CORRIDOR
ROOM NUMBER: 6033

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	002532 CRT06	1	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	N	OF/OI
2	096814 CRT23	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70 - GOWN	G.S. MANUFACTURING GSM-G160 -	N	OF/OI

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, EQUIPMENT
ROOM NUMBER: 6035

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	089251 CRT05	1	CART, RESUSCITATION, CARDIAC 4 DRAWER;2 3",1 6",1 9";ADJ DEFIB TRAY;IV POLE (WxDxH) :44x24x52 CM:111.8x61.0x132.1 ELECT: 120V FOR POWER STRIP -DIMENSIONS LISTED DO NOT INCLUDE SIDE ACCESSORIES, IV POLE HEIGHT, OR DEFIBRILLATOR SHELF HEIGHT	INTERMETRO INDUSTRIES CORP. LECCRP3 LIFELINE	N	OF/OI
2	087848 DEF01	1	DEFIBRILLATOR GUIDELINES 2015 - COMPATIBLE, AED W/MANUAL OVERRIDE (WxDxH) :11x13x8 CM:27.9x33.0x20.3 ELECT: 120VAC;60HZ;2AMPS;SEALED LEAD ACID BATTERY INTEGRAL BATTERY CHARGER	ZOLL MEDICAL CORPORATION 30120000001110012 R SERIES ALS	N	OF/OI
3	092325	1	ASPIRATOR VACUUM;5 SETTINGS;30LPM;BUILT IN AC/DC POWER;LED (WxDxH) :13x7x13 CM:33.0x17.8x33.0 ELECT: 100-240VAC;50/60HZ;RECHARGEABLE 12VDC BATTERY	LAERDAL MEDICAL CORP. 78002001/ACC LSU W/CANISTER	N	OF/OI
4	079188 SHV01	1	SHELVING, WIRE 5 SHELVES;STATIONARY;CHROME;SHELF INLAY (WxDxH) :24x24x74 CM:61.0x61.0x188.0	INTERMETRO INDUSTRIES CORP. A2424NC/74P A2424NC	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 6702

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	006264	1	NOTE:	ZZZ - NOTE: (U.S.)	N	OF/OI
			- 18 REGULAR ROOMS, 1 ISOLATION, 1 POSITIVE PRESSURE			
2	086193 BED01	20	BED, MED-SURG 500# CAP;IBED UPGRADEABLE;INBED SCALE;ISOFLEX (WxDxH) :43x93x30 SPACE: FLOOR CM:109.2x236.2x76.2	STRYKER CORP/MEDICAL DIV S3 PX2-3005 S3	E	OF/OI
			- *ASSUME RELOCATED FROM RICHARDS (R1, R3, R4, R5). CONFIRMATION NEEDED. CONFIRM O2 TANK HOLDER QUANTITIES			
3	053630	20	BED ACCESSORIES FULLY DYNAMIC;NON-PWR;PRESSURE MANAGEMENT SURFACE (WxDxH) :35x84x7 LBS: 50 SPACE: SPACE CM:88.9x213.4x17.8 KG: 22.70	B.G. INDUSTRIES ACCUMAX QUANTUM A3-117610-384	E	OF/OI
			ELECT: 110 VOLT/PHASE 1 - *ASSUME RELOCATED FROM RICHARDS (R1, R3, R4, R5). CONFIRMATION NEEDED.			
4	096840 LFT05	20	LIFTER, PATIENT, ACCESSORY, RAIL 10'STRAIGHT;FOR USE WITH C1000 MOTOR SPACE: CEILING	PRISM MEDICAL 10' STRAIGHT	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 6702

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
5	086984 MON06	20	MONITOR, VITAL SIGNS 8.4"LCD SCREEN;NBP;SPO2;TYMPANIC TEMP;WIRELESS (WxDxH) :11x6x9 LBS: 7 SPACE: WALL CM:27.9x15.2x22.9 KG: 3.10 ELECT: 120 VOLT/60 HZ BATTERY CHARGER LITHIUM ION BATTERY 10.8-11.1V DATA OUTPUT:HL7 FORMAT, VIA ETHERNET PORT SERIAL DATA	PHILIPS MEDICAL SYSTEMS 863283 SURESIGNS VS4	N	OF/OI
6	093331 WCH01	20	WALL CHANNEL WALL CHANNEL;SEISMIC;19" SPACE: WALL	PHILIPS MEDICAL SYSTEMS MXU175	N	OF/CI
7	077835 MNT01	20	MONITOR ACCESSORY, MOUNTING ASSEMBLY VARIABLE HEIGHT MOUNT;TILT/SWIVEL ADJUSTMENT; SPACE: WALL	GCX CORPORATION WA-0011-27 VHM-25	N	OF/OI
8	028803	20	STAND, MAYO MOBILE;CHROME;HAND HEIGHT ADJUSTABLE 30-40 IN (WxDxH) :13x20x40 LBS: 22 SPACE: FLOOR CM:33.0x50.8x101.6 KG: 10.00 - PLACEHOLDER. SPECS TO BE DETERMINED. MAY NOT NEED 1 PER ROOM.	PEDIGO PRODUCTS, INC. P-65 MOBILE	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 6702

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
9	067194	20	I.V. POLE STAINLESS STEEL;5 LEG;3 IN CASTERS;4 HOOK TOP (WxDxH) :23x6x35 LBS: 32 SPACE: FLOOR CM:58.4x15.2x88.9 KG: 14.50 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	PRYOR PRODUCTS 135	N	OF/OI
10	088643	20	I.V. INFUSION PUMP GENERAL INFUSION PUMP;SINGLE CHANNEL;POLE CLAMP; (WxDxH) :8x8x6 LBS: 10 SPACE: SPACE CM:20.3x20.3x15.2 KG: 4.50 ELECT: 120V;50/60HZ;35W;1A;1 RECHARGEABLE BATTERY LEAD-ACID 6V;POWER CORD:HOSPITAL-GRADE AC CORD 10 FT LONG W/TRANSPARENT PLUG AND RETAINER PLATE - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	HOSPIRA, INC. 30010 PLUM 360/MEDNET	N	OF/OI
11	096809	20	PUMP, COMPRESSION DVT;LCD SCREEN;ONE BUTTON START;CARRY HANDLE (WxDxH) :9x8x10 LBS: 9 SPACE: SPACE CM:22.9x20.3x25.4 KG: 4.10 ELECT: 120V/60HZ - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	ARJOHUNTLEIGH ACS900 FLOWTRON	L	OF/OI
12	066897	20	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	MEDLINE INDUSTRIES, INC. MDS89668XW	N	OF/OI



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 6702

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
13	087247	20	WALKER, FOLDING, ADULT SIDE WALKER;ALUMINUM;USER WT CAP 300LBS;HT ADJUST (WxDxH) :19x16x36 LBS: 4 SPACE: FLOOR CM:48.3x40.6x91.4 KG: 1.60 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	PERFORMANCE HEALTHCARE 081561752 HEMI DAYS INVACARE	N	OF/OI
14	063659	20	TABLE, OVERBED SINGLE TOP;W/VANITY;LOW PROFILE U-SHAPED BASE (WxDxH) :21x32x45 LBS: 53 SPACE: FLOOR CM:53.3x81.3x114.3 KG: 24.10 SPECIFY FINISH SPECIFY FINISH: BASE SPECIFY FINISH: EDGE	STRYKER CORP/MEDICAL DIV 3150-000-200 TRU-FIT	N	OF/OI
15	080275	40	REGULATOR, SUCTION, CONTINUOUS & INTERMITTENT 0-200MMHG W/SELECTOR VALVE (OFF,INT,CONT);CANISTER (WxDxH) :4x6x4 LBS: 1 SPACE: WALL CM:10.2x15.2x10.2 KG: 0.50	BOEHRINGER LABORATORIES, INC. 3804/1496/2469 PLATINUM SERIES	N	OF/OI
16	055048	40	FLOWMETER, OXYGEN W/DISS ADAPTOR SPACE: SPACE CONFIRM MEDICAL GAS CONNECTION	AMVEX, DIVISION OF OHIO MEDICAL FM15ODH -	N	OF/OI
17	062114 DSP01	20	DISPENSER EMEBAG DISPENSER (WxDxH) :7x7x7 SPACE: WALL CM:17.8x17.8x17.8	CENTURION MEDICAL PRODUCTS EMED200 EMEBAG	N	OF/CI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 6702

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
18	091196 DSP03	20	DISPENSER, MASK PLEXIGLAS DISPENSER FOR SURGICAL FACE MASK BOXES (WxDxH) :9x6x9 LBS: 2 SPACE: WALL CM:22.9x15.2x22.9 KG: 0.90	MEDLINE INDUSTRIES, INC. NONFM122 NONFM122	N	OF/OI
19	087029 DSL01	20	DISPOSAL CONTAINER, SHARPS W/BRACKET LOCKING WALL CABINET FOR SHARPS CONTAINERS;2 GAL (WxDxH) :15x6x14 SPACE: WALL CM:38.1x15.2x35.6	STERICYCLE OC-02-2004 BIO SYSTEMS	L	OF/CI
20	061957 GLV02	20	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 SPACE: WALL CM:45.7x10.2x22.9	CLINTON INDUSTRIES G-1030 -	N	OF/CI
21	058768 HMP01	20	HAMPER, LINEN W/LID;FOOT PEDAL;STEEL FRAME;POWDER COAT FINISH (WxDxH) :21x22x33 SPACE: FLOOR CM:53.3x55.9x83.8 - INSTALLED IN CASEWORK	CENTURION MEDICAL PRODUCTS CX302 MEDIUM	N	OF/OI
22	078043 HMP02	20	HAMPER, LINEN W/LID;FOOT PEDAL OPERATED;TUBULAR CHROME FRAME; (WxDxH) :19x20x26 SPACE: FLOOR CM:48.3x50.8x66.0 - FOR YELLOW BAG CHEMO. INSTALLED IN CASEWORK	CENTURION MEDICAL PRODUCTS CENTURION CX502	N	OF/OI
23	047636	20	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60	RUBBERMAID COMM. PRODUCTS 2544 40 QT	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 6702

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
24	085429 RLS01	40	RAIL SYSTEM 7"2" VERTICAL RAIL SYSTEM;SURFACE MOUNT;1 TIER SPACE: WALL	MODULAR SERVICES COMPANY 530-4522	N	CF/CI
			- WITH BASKET, SHELF, AND OTHER ACCESSORIES TO BE DETERMINED.			
25	504469	20	CLOCK	ZZZ - GENERIC DESCRIPTIONS	N	OF/OI
			- SPECIFIED BY OTHERS			

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-1 ONCOLOGY-SURGICAL
ROOM NAME: TOILET, PATIENT (QTY 20)
ROOM NUMBER: 6702A

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	047636	20	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60	RUBBERMAID COMM. PRODUCTS 2544 40 QT	N	OF/OI

END OF ROOM
END OF DEPARTMENT



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: STAFF LOUNGE
ROOM NUMBER: 6049

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	058112	2	REFRIGERATOR/FREEZER, UPRIGHT REF02 115V;18.2 CF;TOP FREEZER;NON-ICE;LEFT HINGE;WHITE (WxDxH) :30x32x67 LBS: 205 SPACE: FLOOR CM:76.2x81.3x170.2 KG: 93.00 ELECT: 115V;4.5A;60HZ;407 WATTS	SEARS COMMERCIAL SALES KENMORE 46-68972	N	OF/OI
2	080483	2	OVEN, MICROWAVE OVE01 1000W;S.S. INTERIOR/EXTERIOR (WxDxH) :21x16x13 LBS: 37 SPACE: COUNTER CM:53.3x40.6x33.0 KG: 16.80 ELECT: 120V;14A/11;1.6KW;15AMP NEMA 15-R RECEPTACLE	SHARP ELECTRONICS CORP. R21LCF R21LCF	N	OF/OI
3	090442	1	COFFEE BREWER COF02 SINGLE-CUP BREWER FOR COFFEE, TEA, HOT CHOCOLATE (WxDxH) :11x14x14 LBS: 18 SPACE: COUNTER CM:27.9x35.6x35.6 KG: 8.20 ELECT: 120VAC, 1400 WATTS - TO INCLUDE HOT WATER TAP	KEURIG, INC. COMMERCIAL BREWING K150	L	OF/VI
4	051789	1	TOASTER, COMMERCIAL TST01 2-SLOT;CHROME-PLATED CONSTRUCTION;1 3/8"WIDE SLOTS (WxDxH) :14x9x9 LBS: 5 SPACE: COUNTER CM:35.6x22.9x22.9 KG: 2.30 ELECT: 120 VOLTS/8 AMPS/925 WATTS/PHASE 1	WARING PRODUCTS WCT702 -	N	OF/OI
5	006677	2	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 LBS: 43 SPACE: FLOOR CM:55.9x27.9x76.2 KG: 19.50 SPECIFY COLOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

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DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: STAFF LOUNGE
ROOM NUMBER: 6049

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
6	079040	1	CHAIR, MASSAGE 6 MOTOR;2 AIR PUMPS;FULL BODY;RECLINER;LCD SCREEN (WxDxH) :31x53x49 LBS: 220 SPACE: FLOOR CM:78.7x134.6x124.5 KG: 99.80 ELECT: AC 120V;60HZ;20-230W	BEAUTYHEALTH BC-07DH	N	OF/OI

END OF ROOM



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

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DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: CORRIDOR
ROOM NUMBER: 6051

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	093412 MVD01	4	MONITOR, VIDEO MXU0299: DISPLAY FLAT PANEL NON-TOUCH PIIC SPACE: SPACE	PHILIPS MEDICAL SYSTEMS MXU0299 866390	N	OF/OI
2	093331 WCH01	4	WALL CHANNEL WALL CHANNEL;SEISMIC;19" SPACE: WALL	PHILIPS MEDICAL SYSTEMS MXU175	N	OF/OI

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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT CARE STATION (QTY 3)
ROOM NUMBER: 6052

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	087769 MON01	1	MONITOR, CENTRAL STATION PIIC IX SURVEILLANCE CENTRAL MONITORING;19" TOUCH (WxDxH) :48x16x16 SPACE: COUNTER CM:121.9x40.6x40.6 ELECT: CPU: 115 VAC;60 HZ;5.2 AMPS LCD DISPLAY: 115 VAC;60 HZ;48W TYP. UPS: 115 VAC;60 HZ;5.6 AMPS PRINTER: 117 VAC;60 HZ;5.3 AMPS HVAC: MUST MAINTAIN TEMP AT 62-82 DEGREES F AND NON-CONDENSING RELATIVE HUMIDITY AT 30-60% CPU: 215 BTU/HR UPS: 437 BTU/HR (MAX) DATA CONNECTION REQUIRED, SEE TECH SHEET	PHILIPS MEDICAL SYSTEMS INTELLIVUE INFO CENTER IX	N	OF/OI
2	504528 MON17	1	ALLOWANCE, MONITORING, TELEMETRY	ZZZ - MONITORING	N	OF/OI
- ALLOWANCE FOR TELEMETRY INFRASTRUCTURE						
3	086723 ANA01	2	LAB ANALYZER, GLUCOSE BLOOD GLUCOSE & KETONE MONITORING;BARCODE READER (WxDxH) :3x2x8 LBS: 1 SPACE: SPACE CM:7.6x5.1x20.3 KG: 0.50 ELECT: 2 AA BATTERIES (ALKALINE, LITHIUM, OR NICAD)	ABBOTT DIAGNOSTICS 71411-70 PRECISION PRO	N	OF/OI

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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL

ROOM NAME: MEDICATION

ROOM NUMBER: 6059

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	072239	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/VI
	MED02		14.75"LCD MONITOR;KEYBOARD;TOUCHPAD;BIO-ID SCANNER (WxDxH) :23x27x55 LBS: 166 SPACE: FLOOR CM:58.4x68.6x139.7 KG: 75.30	MEDSTATION ES 6 DRAWER MAIN		
			ELECT: 120V;60HZ;3 AMPS MAX EMERGENCY POWER REQUIRED			
			HVAC: 409 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET - NEED TO UPDATE TO ES SERIES			
2	072241	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/OI
	MED05		SLIDE BRACKETS W/DRAWER RELEASE;PLASTIC TOP (WxDxH) :23x47x47 LBS: 133 SPACE: FLOOR CM:58.4x119.4x119.4 KG: 60.30	7 DRAWER AUXILIARY MEDSTATION ES		
			ELECT: 120V;60HZ;3 AMPS MAX;EMERGENCY POWER REQUIRED			
			HVAC: 222 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET			
3	072243	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/OI
	MED03		SINGLE COLUMN;1 STORAGE SHELF PER DOOR;INTERIOR (WxDxH) :31x28x80 LBS: 314 SPACE: FLOOR CM:78.7x71.1x203.2 KG: 142.40	FOUR DOOR AUXILIARY MEDSTATION ES		
			ELECT: 120V;60HZ;3 AMPS;EMERGENCY POWER REQUIRED			
			HVAC: 222 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET			



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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: MEDICATION
ROOM NUMBER: 6059

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
4	079417 REF01	1	REFRIGERATOR, UPRIGHT, MEDICAL GRADE 115V;SINGLE DOOR;19.7 CF;SS;LED DIG. TEMP;LOCKING (WxDxH) :30x31x80 LBS: 395 SPACE: FLOOR CM:76.2x78.7x203.2 KG: 179.20 ELECT: 115V,60HZ,8.7A HVAC: 950 BTU/HR MAX HEAT REJECTION	FOLLETT CORPORATION REF20-LB-R000 REF20-LB-R000	N	OF/OI
5	053907 MED01	1	DISPENSER, MEDICATION, ACCESSORY MED DISPENSING UNIT REFRIGERATOR CONTROL (WxDxH) :3x6x7 LBS: 4 SPACE: SPACE CM:7.6x15.2x17.8 KG: 1.80 ELECT: POWERED FROM MAIN DISPENSER	BD CAREFUSION PYXIS REMOTE MANAGER MSRM	N	OF/VI
6	506535 OSS01	1	OPEN SUPPLY SYSTEM - PAREX SUPPLY SYSTEM, WEIGHT BASED -PROVIDE BACKING ON ALL WALLS WITH NO OUTLETS EXTENDING BEYOND 12" AFF. REQUIRES POWER AND DATA AT CONTROL LOCATION.	ZZZ - GENERIC DESCRIPTIONS	N	OF/VI
7	077862 BIN01	2	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 SPACE: WALL CM:91.4x2.5x48.3	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: MEDICATION
ROOM NUMBER: 6059

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
8	093412 MVD01	1	MONITOR, VIDEO MXU0299: DISPLAY FLAT PANEL NON-TOUCH PIIC SPACE: SPACE	PHILIPS MEDICAL SYSTEMS MXU0299 866390	N	OF/OI
			- TO INCLUDE SPEAKERS			
9	055704 EWS01	1	ENCLOSURE, WALL, SHARPS 2 OR 5 QT WALL ENCLOSURE (WxDxH) :13x6x12 CM:33.0x15.2x30.5 SPACE: WALL	KENDALL HEALTHCARE, COVIDIEN 85161H IN-ROOM	L	OF/CI
10	093535 DSL02	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL 2GAL;BLACK;WHITE HINGED LID W/PORT;LEAK RESISTANT (WxDxH) :12x10x12 CM:30.5x25.4x30.5 SPACE: WALL	KENDALL HEALTHCARE, COVIDIEN 8602RC/8963 8602RC/8963	N	OF/OI
11	061957 GLV02	1	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 CM:45.7x10.2x22.9 SPACE: WALL	CLINTON INDUSTRIES G-1030 -	N	OF/CI
12	006677	1	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 CM:55.9x27.9x76.2 LBS: 43 KG: 19.50 SPACE: FLOOR SPECIFY COLOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: MEDICATION
ROOM NUMBER: 6059

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
13	047636	2	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60 - PLACEHOLDER FOR RED AND BLACK BINS. NEED VENDOR AND MODEL.	RUBBERMAID COMM. PRODUCTS 2544 40 QT	N	OF/OI

END OF ROOM



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: CLEAN SUPPLY
ROOM NUMBER: 6063

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	506535 OSS01	1	OPEN SUPPLY SYSTEM	ZZZ - GENERIC DESCRIPTIONS	N	OF/VI
			- PAREX SUPPLY SYSTEM, WEIGHT BASED -PROVIDE BACKING ON ALL WALLS WITH NO OUTLETS EXTENDING BEYOND 12" AFF. REQUIRES POWER AND DATA AT CONTROL LOCATION.			
2	077862 BIN01	30	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 CM:91.4x2.5x48.3	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI
			SPACE: WALL			
3	084658 CRT01	5	CART, CYLINDER, MEDICAL GAS 6 CAPACITY; E/D SIZE;W/HEAVY DUTY 5" CASTERS (WxDxH) :11x16x39 CM:27.9x40.6x99.1	W.T. FARLEY, INC. CR-DC06E-G -	N	OF/OI
			LBS: 22 KG: 10.00			
			SPACE: FLOOR			

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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: SOILED HOLDING
ROOM NUMBER: 6064

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	094910 COM01	1	COMPACTOR, WASTE 20:1 COMPACT RATION;COMMERCIAL;ELECTROHYDRAULIC (WxDxH) :43x31x90 LBS: 1210 SPACE: FLOOR CM:109.2x78.7x228.6 KG: 548.80 ELECT: 115V;60HZ;15 AMP;SINGLE PHASE;DEDICATED CIRCUIT - ECO-PACK	FOUNTAIN INDUSTRIES ECO-PACK 3600	N	OF/OI
2	079188 SHV01	1	SHELVING, WIRE 5 SHELVES;STATIONARY;CHROME;SHELF INLAY (WxDxH) :24x24x74 SPACE: FLOOR CM:61.0x61.0x188.0	INTERMETRO INDUSTRIES CORP. A2424NC/74P A2424NC	N	OF/OI
3	073358 TRK01	1	TRUCK/BIN, LINEN HORIZONTAL SHELVES;POLYETHYLENE;IMPACT RESISTANT (WxDxH) :48x29x64 SPACE: FLOOR CM:121.9x73.7x162.6	MEESE ORBITRON DUNNE CO. POLY TRUX 90P	N	OF/OI
4	066897	1	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0	MEDLINE INDUSTRIES, INC. MDS89668XW	N	OF/OI
5	096813	1	WASTE RECEPTACLE, STEP-ON 12 GAL;WHITE;FOOT PEDAL OPERATED;FIRE SAFE (WxDxH) :12x12x23 SPACE: FLOOR CM:30.5x30.5x58.4	RUBBERMAID COMM. PRODUCTS RCPST12ERBWHI DEFENDERS	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: SOILED HOLDING
ROOM NUMBER: 6064

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
6	071200	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL 9 GALLON;CLEAR SLIDE TOP;RECYCLED PLASTIC-BLACK (WxDxH) :18x12x19 SPACE: SPACE CM:45.7x30.5x48.3 SPECIFY ACCESSORIES AS SEPARATE LINE ITEMS	BECTON DICKINSON RCRA HAZARDOUS WASTE 305069	N	OF/OI
7	070664	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL CHEMOTHERAPY;PLASTIC;18 GAL;YELLOW;SLIDING LID (WxDxH) :18x13x26 LBS: 8 SPACE: FLOOR CM:45.7x33.0x66.0 KG: 3.60	KENDALL HEALTHCARE, COVIDIEN 8939 CHEMO DISPOSAL	N	OF/OI
8	089948	1	WASTE RECEPTACLE, RECYCLING 23 GALLON;DARK BLUE;RECYCLE SYMBOL;W/ LID (WxDxH) :20x11x35 SPACE: FLOOR CM:50.8x27.9x88.9	RUBBERMAID COMM. PRODUCTS H-1385BLU SLIMJIM 3540-07	N	OF/OI
9	079178	1	WASTE RECEPTACLE CONFIDENTIAL;SIDE PAPER SLOT;KEYPAD LOCK;SHIPS (WxDxH) :11x24x25 LBS: 30 SPACE: FLOOR CM:27.9x61.0x63.5 KG: 13.60	RUBBERMAID COMM. PRODUCTS 9W25 SLIM JIM	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, CART (QTY 2)
ROOM NUMBER: 6065

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	092815 CRT04	2	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - IV CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	N	OF/OI
2	092815 CRT04	2	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - RT CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	N	OF/OI
3	092815 CRT04	2	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - FOR LINEN	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	N	OF/OI
4	092750 MON05	2	MONITOR, VITAL SIGNS NIBP;SPO2;TEMPERATURE;RECORDER;ADULT/PEDIATRIC/ (WxDxH) :25x25x50 CM:63.5x63.5x127.0 LBS: 12 KG: 5.40 SPACE: FLOOR ELECT: 120 VOLT/60 HZ BATTERY CHARGER 10.8-11.1V LITHIUM ION BATTERY - FOR AMBULATION	PHILIPS MEDICAL SYSTEMS 863283/989803176601 SURE SIGNS VS4	N	OF/OI



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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, CART (QTY 2)
ROOM NUMBER: 6065

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
5	089251 CRT05	2	CART, RESUSCITATION, CARDIAC 4 DRAWER;2 3",1 6",1 9";ADJ DEFIB TRAY;IV POLE (WxDxH) :44x24x52 CM:111.8x61.0x132.1 ELECT: 120V FOR POWER STRIP -DIMENSIONS LISTED DO NOT INCLUDE SIDE ACCESSORIES, IV POLE HEIGHT, OR DEFIBRILLATOR SHELF HEIGHT	INTERMETRO INDUSTRIES CORP. LECCRP3 LIFELINE	N	OF/OI
6	087848 DEF01	2	DEFIBRILLATOR GUIDELINES 2015 - COMPATIBLE, AED W/MANUAL OVERRIDE (WxDxH) :11x13x8 CM:27.9x33.0x20.3 ELECT: 120VAC;60HZ;2AMPS;SEALED LEAD ACID BATTERY INTEGRAL BATTERY CHARGER	ZOLL MEDICAL CORPORATION 30120000001110012 R SERIES ALS	N	OF/OI
7	092325	2	ASPIRATOR VACUUM;5 SETTINGS;30LPM;BUILT IN AC/DC POWER;LED (WxDxH) :13x7x13 CM:33.0x17.8x33.0 ELECT: 100-240VAC;50/60HZ;RECHARGEABLE 12VDC BATTERY	LAERDAL MEDICAL CORP. 78002001/ACC LSU W/CANISTER	N	OF/OI

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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: STORAGE, EQUIP
ROOM NUMBER: 6066

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	006264	1	NOTE:	ZZZ - NOTE: (U.S.)	I	OF/OI
			- PLACE HOLDER FOR EQUIPMENT			
2	014753 SHV02	1	SHELVING, WIRE MOBILE;CHROME;5 SHELF;4 CASTER STEM BRAKES (WxDxH) :51x25x69 LBS: 60 SPACE: FLOOR CM:129.6x63.5x175.3 KG: 27.30	INTERMETRO INDUSTRIES CORP. 2448NC/63UP/ACC. SUPER ERECTA	N	OF/VI
3	002532 CRT06	1	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	N	OF/OI
4	058498	1	SPHYGMOMANOMETER, ANEROID, MOBILE 5 LEG STAND;CERTIFIED ACCURATE TO 3MMHG;LATEX (WxDxH) :18x18x36 LBS: 12 SPACE: FLOOR CM:45.7x45.7x91.4 KG: 5.50	WELCH ALLYN, INC. 7670-03	N	OF/OI
5	072678 DOP01	1	DOPPLER, FLOW DETECTOR NON-DIRECTIONAL POCKET DOPPLER W/BUILT-IN (WxDxH) :18x18x36 LBS: 2 SPACE: FLOOR CM:45.7x45.7x91.4 KG: 0.90 ELECT: 9V ALKALINE BATTERY	HUNTLEIGH HEALTHCARE D900-P-USA/EZ8 D900 DOPPLEX	N	OF/OI
6	086490	1	OPHTHALMOSCOPE/OTOSCOPE MOBILE STAND; PANOPTIC OPHTHALMOSCOPE;MACROVIEW (WxDxH) :22x22x54 SPACE: FLOOR CM:55.9x55.9x137.2 ELECT: 100-240V;50/60HZ;.18 AMPS MAX	WELCH ALLYN, INC. 77710-82M/ACC GS 777 SERIES	N	OF/OI



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: STORAGE, EQUIP
ROOM NUMBER: 6066

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
7	067194	2	I.V. POLE STAINLESS STEEL;5 LEG;3 IN CASTERS;4 HOOK TOP (WxDxH) :23x6x35 LBS: 32 SPACE: FLOOR CM:58.4x15.2x88.9 KG: 14.50	PRYOR PRODUCTS 135	N	OF/OI
8	088643	2	I.V. INFUSION PUMP GENERAL INFUSION PUMP;SINGLE CHANNEL;POLE CLAMP; (WxDxH) :8x8x6 LBS: 10 SPACE: SPACE CM:20.3x20.3x15.2 KG: 4.50 ELECT: 120V;50/60HZ;35W;1A;1 RECHARGEABLE BATTERY LEAD-ACID 6V;POWER CORD:HOSPITAL-GRADE AC CORD 10 FT LONG W/TRANSPARENT PLUG AND RETAINER PLATE	HOSPIRA, INC. 30010 PLUM 360/MEDNET	N	OF/OI
9	087247	2	WALKER, FOLDING, ADULT SIDE WALKER;ALUMINUM;USER WT CAP 300LBS;HT ADJUST (WxDxH) :19x16x36 LBS: 4 SPACE: FLOOR CM:48.3x40.6x91.4 KG: 1.60	PERFORMANCE HEALTHCARE 081561752 HEMI DAYS INVACARE	N	OF/OI
10	066897	2	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0	MEDLINE INDUSTRIES, INC. MDS89668XW	N	OF/OI
11	096810 BRD01	1	BOARD, PATIENT TRANSFER 529 LB CAPACITY;FOR USE IN RADIOLOGY,SURGERY,ICU (WxDxH) :20x70x2 LBS: 8 SPACE: WALL CM:50.8x177.8x5.1 KG: 3.80	SAMARIT 440.0100 HIGHTEC	N	OF/OI
12	078455 BRD03	1	BOARD, PATIENT TRANSFER SURGIBOARD 47X16";TO AND FROM OR TABLE (WxDxH) :16x47x2 SPACE: WALL CM:40.6x119.4x5.1	MCAULEY MEDICAL INC 440.0400 SAMARIT	I	OF/OI



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: STORAGE, EQUIP
ROOM NUMBER: 6066

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
13	055330	1	LIFTER, PATIENT INFLATABLE;NYLON OXFORD;TESTED UPT 1100LBS (WxDxH) :39x70x30 SPACE: FLOOR CM:99.1x177.8x76.2 ELECT: 120V/60HZ/1100 WATTS;GROUNDED;14' POWER CORD	HOVERTECH INTERNATIONAL HJ3902/AIR400G/ACC HOVERJACK	N	OF/OI
14	057580 LFT02	1	CART HOLDS HOVERJACK AIR SUPPLY AND LIFT (WxDxH) :25x18x38 LBS: 26 SPACE: FLOOR CM:63.5x45.7x96.5 KG: 11.80	HOVERTECH INTERNATIONAL HJC-100 HOVER JACK	N	OF/OI
15	073144	1	TRANSILLUMINATOR VEIN LOCATOR;INFRARED LIGHT;HAND HELD;BATTERY (WxDxH) :24x24x36 SPACE: FLOOR CM:61.0x61.0x91.4	BODIFLOW, LLC AV300 ACCUVEIN	N	OF/OI
16	094909 CRT07	1	CART, UTILITY MULTIPURPOSE CART;800LB CAPACITY;5"WHEELS (WxDxH) :21x31x42 LBS: 44 SPACE: FLOOR CM:53.3x78.7x106.7 KG: 20.00	VERSACART EZTOTE 390 101-390	N	OF/OI
17	074251	2	CRUTCHES ALUMINUM;HAND GRIP;I-BEAM ADJUSTMENT;300LB CAP SPACE: SPACE	MEDLINE INDUSTRIES, INC. QUICK FIT MDS80540	N	OF/OI
18	082590	1	WALKER 4-WHEEL WALKER;8" NON-MARRING CASTERS;300LB CAP (WxDxH) :24x26x37 LBS: 20 SPACE: FLOOR CM:61.0x66.0x94.0 KG: 9.10	PERFORMANCE HEALTHCARE 081576974 ROLLATOR WALKER	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: STORAGE, EQUIP
ROOM NUMBER: 6066

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
19	091438	1	CHAIR, SHOWER 500LB USER WT CAP;14-19" HT ADJ SEAT;W/KNOCK DOWN (WxDxH) :18x20x30 LBS: 8 SPACE: FLOOR CM:45.7x50.8x76.2 KG: 3.40	DRIVE MEDICAL 12021KD-1 DELUXE BARI	N	OF/OI
20	074071 LFT01	4	LIFTER, PATIENT MOBILE;400LB CAP;ACTIVE STANDING/TRANSFER AID (WxDxH) :29x33x42 LBS: 65 SPACE: FLOOR CM:73.7x83.8x106.7 KG: 29.50 - NEED TO CONFIRM EXISTING	ARJOHUNTLEIGH SARA STEDY NTB2000	N	OF/OI
21	078100	6	LIFTER, PATIENT, ACCESSORY, MOTOR 625LB LIFT MOTOR, 24VDC, CEILING RAIL MOUNTED; (WxDxH) :13x9x6 LBS: 18 SPACE: SPACE CM:33.0x22.9x15.2 KG: 8.20 ELECT: 24VDC, 1.5A	PRISM MEDICAL C625 MOTOR C625 MOTOR	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, NUTRITION
ROOM NUMBER: 6067

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	095453	1	CART, FOOD	LAKESIDE MFG. CO.	N	OF/OI
	CRT02		SS;6 TRAY CAPACITY;6"LEDGE SPACING;REMOVABLE DOOR (WxDxH) :33x22x46 LBS: 110 SPACE: FLOOR CM:83.8x55.9x116.9 KG: 49.90	SP-6373 ELITE		
			- SOILED TRAY CART			

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: ALCOVE, LINEN
ROOM NUMBER: 6068

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	096814 CRT03	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70	G.S. MANUFACTURING GSM-G160 -	N	OF/OI
2	096814 CRT23	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70 - GOWN	G.S. MANUFACTURING GSM-G160 -	N	OF/OI
3	078147 CAB01	1	CABINET, WARMING MOBILE;2 COMPARTMENTS;20.6CF;GLASS DOORS;SEPARATE (WxDxH) :32x25x74 LBS: 358 SPACE: FLOOR CM:81.3x63.5x188.0 KG: 162.40 ELECT: 120V;50/60HZ;1PH;15A;1.8KW NEMA 5-20P;20A-125V PLUG HOSPITAL GRADE SPECIFY DOOR HINGE;RIGHT OR LEFT - PLACEHOLDER FOR FULL SIZE, SINGLE COMPARTMENT	PEDIGO PRODUCTS, INC. P-2055 P-2055	N	OF/OI
4	002532 CRT06	1	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: NOURISHMENT
ROOM NUMBER: 6074

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	058112 REF02	1	REFRIGERATOR/FREEZER, UPRIGHT 115V;18.2 CF;TOP FREEZER;NON-ICE;LEFT HINGE;WHITE (WxDxH) :30x32x67 LBS: 205 SPACE: FLOOR CM:76.2x81.3x170.2 KG: 93.00 ELECT: 115V;4.5A;60HZ;407 WATTS	SEARS COMMERCIAL SALES KENMORE 46-68972	N	OF/OI
2	087445 ICE01	1	ICE MAKER W/WATER DISPENSER 12# STORAGE CAP;425#/24HR;LEVER;W/O FILTER (WxDxH) :17x24x33 LBS: 199 SPACE: COUNTER CM:43.2x61.0x83.8 KG: 90.30 ELECT: 115VAC/60HZ/1PH/11A/.8KW 8.5' CORD W/NEMA 5-15 HOSPITAL GRADE PLUG HVAC: 5000 BTU/HR CLEARANCES: VENTILATION 6" TOP & RIGHT SIDES SERVICE 12" TOP PLUMB: REFER TO VENDOR TECHNICAL INFORMATION	FOLLETT CORPORATION 12CI425A-L AIR COOLED	N	OF/CI
3	080483 OVE01	1	OVEN, MICROWAVE 1000W;S.S. INTERIOR/EXTERIOR (WxDxH) :21x16x13 LBS: 37 SPACE: COUNTER CM:53.3x40.6x33.0 KG: 16.80 ELECT: 120V;14A/11;1.6KW;15AMP NEMA 15-R RECEPTACLE	SHARP ELECTRONICS CORP. R21LCF R21LCF	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: NOURISHMENT
ROOM NUMBER: 6074

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
4	062450	1	COFFEE BREWER PLUMBED;1 LOWER BREWER/2 UPPER WARMERS;200 OZ CAP. (WxDxH) :9x22x19 LBS: 30 SPACE: COUNTER CM:22.9x55.9x48.3 KG: 13.60 ELECT: 120V/15AMPS;TANK HEATER 1425W;TOTAL WATTS 1800 CORD ATTACHED;REQ.2-WIRES PLUS GROUND SERVICE RATED 120V,SINGLE PHASE,60HZ. PLUMB: 20-90 PSI (138-621 KPA).MACHINES SUPPLIED W/ 1/4" MALE FLARE FITTING - TO INCLUDE HOT WATER TAP	BUNN-O-MATIC CORP. AXIOM-15-3-0000/ACC 38700.0000	L	OF/VI
5	051789	1	TOASTER, COMMERCIAL 2-SLOT;CHROME-PLATED CONSTRUCTION;1 3/8"WIDE SLOTS (WxDxH) :14x9x9 LBS: 5 SPACE: COUNTER CM:35.6x22.9x22.9 KG: 2.30 ELECT: 120 VOLTS/8 AMPS/925 WATTS/PHASE 1	WARING PRODUCTS WCT702 -	N	OF/OI
6	094915	1	DISPENSER, FOOD SERVICE, BEVERAGE SOFT DRINK;4 POST MIXING DISPENSING VALVES;LEG KIT (WxDxH) :11x26x28 LBS: 145 SPACE: COUNTER CM:27.9x66.0x71.1 KG: 65.80 ELECT: 120V;60HZ;7 AMPS PLUMB: SS LABELED INLET SYRUP/WATER;3/8"BARB - COORDINATION REQUIRED FOR SYRUP, CO2, ETC UNDER COUNTER	LANCER CORP. CED 500	L	OF/OI
7	061957	1	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 SPACE: WALL CM:45.7x10.2x22.9	CLINTON INDUSTRIES G-1030 -	N	OF/CI



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

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DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: NOURISHMENT
ROOM NUMBER: 6074

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
8	006677	1	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 LBS: 43 SPACE: FLOOR CM:55.9x27.9x76.2 KG: 19.50 SPECIFY COLOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: STORAGE, RT TANK
ROOM NUMBER: 6080

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	084658 CRT01	3	CART, CYLINDER, MEDICAL GAS 6 CAPACITY; E/D SIZE;W/HEAVY DUTY 5" CASTERS (WxDxH) :11x16x39 LBS: 22 SPACE: FLOOR CM:27.9x40.6x99.1 KG: 10.00	W.T. FARLEY, INC. CR-DC06E-G -	N	OF/OI
2	089776	8	HUMIDIFIER WARMED/HUMIDIFIED RESPIRATORY GASES;2-60 L/MIN (WxDxH) :7x12x7 LBS: 5 SPACE: COUNTER CM:17.8x30.5x17.8 KG: 2.30 ELECT: 100-115V;50/60HZ;2.2 AMPS	FISHER & PAYKEL HEALTHCARE AIRVO 2	N	OF/OI

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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 6721

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	006264	1	NOTE:	ZZZ - NOTE: (U.S.)	N	OF/OI
			- 10 REGULAR ROOMS, 1 ISOLATION, 1 POSITIVE PRESSURE			
2	086193 BED01	12	BED, MED-SURG 500# CAP;IBED UPGRADEABLE;INBED SCALE;ISOFLEX (WxDxH) :43x93x30 SPACE: FLOOR CM:109.2x236.2x76.2	STRYKER CORP/MEDICAL DIV S3 PX2-3005 S3	E	OF/OI
			- *ASSUME RELOCATED FROM RICHARDS (R1, R3, R4, R5). CONFIRMATION NEEDED. CONFIRM O2 TANK HOLDER QUANTITIES			
3	053630	12	BED ACCESSORIES FULLY DYNAMIC;NON-PWR;PRESSURE MANAGEMENT SURFACE (WxDxH) :35x84x7 LBS: 50 SPACE: SPACE CM:88.9x213.4x17.8 KG: 22.70	B.G. INDUSTRIES ACCUMAX QUANTUM A3-117610-384	E	OF/OI
			ELECT: 110 VOLT/PHASE 1 - *ASSUME RELOCATED FROM RICHARDS (R1, R3, R4, R5). CONFIRMATION NEEDED.			
4	096840 LFT05	12	LIFTER, PATIENT, ACCESSORY, RAIL 10'STRAIGHT;FOR USE WITH C1000 MOTOR SPACE: CEILING	PRISM MEDICAL 10' STRAIGHT	N	OF/VI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 6721

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
5	086984 MON06	12	MONITOR, VITAL SIGNS 8.4"LCD SCREEN;NBP;SPO2;TYMPANIC TEMP;WIRELESS (WxDxH) :11x6x9 LBS: 7 SPACE: WALL CM:27.9x15.2x22.9 KG: 3.10 ELECT: 120 VOLT/60 HZ BATTERY CHARGER LITHIUM ION BATTERY 10.8-11.1V DATA OUTPUT:HL7 FORMAT, VIA ETHERNET PORT SERIAL DATA	PHILIPS MEDICAL SYSTEMS 863283 SURESIGNS VS4	N	OF/OI
6	093331 WCH01	12	WALL CHANNEL WALL CHANNEL;SEISMIC;19" SPACE: WALL	PHILIPS MEDICAL SYSTEMS MXU175	N	OF/CI
7	077835 MNT01	12	MONITOR ACCESSORY, MOUNTING ASSEMBLY VARIABLE HEIGHT MOUNT;TILT/SWIVEL ADJUSTMENT; SPACE: WALL	GCX CORPORATION WA-0011-27 VHM-25	N	OF/OI
8	028803	12	STAND, MAYO MOBILE;CHROME;HAND HEIGHT ADJUSTABLE 30-40 IN (WxDxH) :13x20x40 LBS: 22 SPACE: FLOOR CM:33.0x50.8x101.6 KG: 10.00 - PLACEHOLDER. SPECS TO BE DETERMINED. MAY NOT NEED 1 PER ROOM.	PEDIGO PRODUCTS, INC. P-65 MOBILE	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 6721

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
9	067194	12	I.V. POLE STAINLESS STEEL;5 LEG;3 IN CASTERS;4 HOOK TOP (WxDxH) :23x6x35 LBS: 32 SPACE: FLOOR CM:58.4x15.2x88.9 KG: 14.50 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	PRYOR PRODUCTS 135	N	OF/OI
10	088643	12	I.V. INFUSION PUMP GENERAL INFUSION PUMP;SINGLE CHANNEL;POLE CLAMP; (WxDxH) :8x8x6 LBS: 10 SPACE: SPACE CM:20.3x20.3x15.2 KG: 4.50 ELECT: 120V;50/60HZ;35W;1A;1 RECHARGEABLE BATTERY LEAD-ACID 6V;POWER CORD:HOSPITAL-GRADE AC CORD 10 FT LONG W/TRANSPARENT PLUG AND RETAINER PLATE - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	HOSPIRA, INC. 30010 PLUM 360/MEDNET	N	OF/OI
11	096809	12	PUMP, COMPRESSION DVT;LCD SCREEN;ONE BUTTON START;CARRY HANDLE (WxDxH) :9x8x10 LBS: 9 SPACE: SPACE CM:22.9x20.3x25.4 KG: 4.10 ELECT: 120V/60HZ - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	ARJOHUNTLEIGH ACS900 FLOWTRON	L	OF/OI
12	066897	12	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	MEDLINE INDUSTRIES, INC. MDS89668XW	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 6721

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
13	087247	12	WALKER, FOLDING, ADULT SIDE WALKER;ALUMINUM;USER WT CAP 300LBS;HT ADJUST (WxDxH) :19x16x36 LBS: 4 SPACE: FLOOR CM:48.3x40.6x91.4 KG: 1.60 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	PERFORMANCE HEALTHCARE 081561752 HEMI DAYS INVACARE	N	OF/OI
14	063659	12	TABLE, OVERBED SINGLE TOP;W/VANITY;LOW PROFILE U-SHAPED BASE (WxDxH) :21x32x45 LBS: 53 SPACE: FLOOR CM:53.3x81.3x114.3 KG: 24.10 SPECIFY FINISH SPECIFY FINISH: BASE SPECIFY FINISH: EDGE	STRYKER CORP/MEDICAL DIV 3150-000-200 TRU-FIT	N	OF/OI
15	080275	24	REGULATOR, SUCTION, CONTINUOUS & INTERMITTENT 0-200MMHG W/SELECTOR VALVE (OFF,INT,CONT);CANISTER (WxDxH) :4x6x4 LBS: 1 SPACE: WALL CM:10.2x15.2x10.2 KG: 0.50	BOEHRINGER LABORATORIES, INC. 3804/1496/2469 PLATINUM SERIES	N	OF/OI
16	055048	24	FLOWMETER, OXYGEN W/DISS ADAPTOR SPACE: SPACE CONFIRM MEDICAL GAS CONNECTION	AMVEX, DIVISION OF OHIO MEDICAL FM15ODH -	N	OF/OI
17	062114 DSP01	12	DISPENSER EMEBAG DISPENSER (WxDxH) :7x7x7 SPACE: WALL CM:17.8x17.8x17.8	CENTURION MEDICAL PRODUCTS EMED200 EMEBAG	N	OF/CI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 6721

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
18	091196 DSP03	12	DISPENSER, MASK PLEXIGLAS DISPENSER FOR SURGICAL FACE MASK BOXES (WxDxH) :9x6x9 LBS: 2 SPACE: WALL CM:22.9x15.2x22.9 KG: 0.90	MEDLINE INDUSTRIES, INC. NONFM122 NONFM122	N	OF/OI
19	087029 DSL01	12	DISPOSAL CONTAINER, SHARPS W/BACKET LOCKING WALL CABINET FOR SHARPS CONTAINERS;2 GAL (WxDxH) :15x6x14 SPACE: WALL CM:38.1x15.2x35.6	STERICYCLE OC-02-2004 BIO SYSTEMS	L	OF/CI
20	061957 GLV02	12	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 SPACE: WALL CM:45.7x10.2x22.9	CLINTON INDUSTRIES G-1030 -	N	OF/CI
21	058768 HMP01	12	HAMPER, LINEN W/LID;FOOT PEDAL;STEEL FRAME;POWDER COAT FINISH (WxDxH) :21x22x33 SPACE: FLOOR CM:53.3x55.9x83.8 - INSTALLED IN CASEWORK	CENTURION MEDICAL PRODUCTS CX302 MEDIUM	N	OF/OI
22	078043 HMP02	12	HAMPER, LINEN W/LID;FOOT PEDAL OPERATED;TUBULAR CHROME FRAME; (WxDxH) :19x20x26 SPACE: FLOOR CM:48.3x50.8x66.0 - FOR YELLOW BAG CHEMO. INSTALLED IN CASEWORK	CENTURION MEDICAL PRODUCTS CENTURION CX502	N	OF/OI
23	047636	12	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60	RUBBERMAID COMM. PRODUCTS 2544 40 QT	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 6721

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
24	085429 RLS01	24	RAIL SYSTEM 7"2" VERTICAL RAIL SYSTEM;SURFACE MOUNT;1 TIER SPACE: WALL	MODULAR SERVICES COMPANY 530-4522	N	CF/CI
			- WITH BASKET, SHELF, AND OTHER ACCESSORIES TO BE DETERMINED.			
25	504469	12	CLOCK	ZZZ - GENERIC DESCRIPTIONS	N	OF/OI
			- SPECIFIED BY OTHERS			

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E6-2 ONCOLOGY-SURGICAL
ROOM NAME: TOILET, PATIENT (QTY 12)
ROOM NUMBER: 6721A

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	047636	12	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60	RUBBERMAID COMM. PRODUCTS 2544 40 QT	N	OF/OI

END OF ROOM
END OF DEPARTMENT



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

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DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: CORRIDOR
ROOM NUMBER: 7004

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	093412 MVD01	4	MONITOR, VIDEO MXU0299: DISPLAY FLAT PANEL NON-TOUCH PIIC SPACE: SPACE	PHILIPS MEDICAL SYSTEMS MXU0299 866390	N	OF/OI
2	093331 WCH01	4	WALL CHANNEL WALL CHANNEL;SEISMIC;19" SPACE: WALL	PHILIPS MEDICAL SYSTEMS MXU175	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: PATIENT CARE STATION (QTY 5)
ROOM NUMBER: 7005

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	087769 MON01	1	MONITOR, CENTRAL STATION PIIC IX SURVEILLANCE CENTRAL MONITORING;19" TOUCH (WxDxH) :48x16x16 CM:121.9x40.6x40.6 SPACE: COUNTER	PHILIPS MEDICAL SYSTEMS INTELLIVUE INFO CENTER IX	N	OF/OI
			ELECT: CPU: 115 VAC;60 HZ;5.2 AMPS LCD DISPLAY: 115 VAC;60 HZ;48W TYP. UPS: 115 VAC;60 HZ;5.6 AMPS PRINTER: 117 VAC;60 HZ;5.3 AMPS			
			HVAC: MUST MAINTAIN TEMP AT 62-82 DEGREES F AND NON-CONDENSING RELATIVE HUMIDITY AT 30-60% CPU: 215 BTU/HR UPS: 437 BTU/HR (MAX) DATA CONNECTION REQUIRED, SEE TECH SHEET			
2	505366	1	MONITORING SYSTEM	ZZZ - MONITORING	N	OF/OI
			- ALLOWANCE FOR MONITORING INFRASTRUCTURE			
3	086723 ANA01	3	LAB ANALYZER, GLUCOSE BLOOD GLUCOSE & KETONE MONITORING;BARCODE READER (WxDxH) :3x2x8 CM:7.6x5.1x20.3 LBS: 1 KG: 0.50 SPACE: SPACE	ABBOTT DIAGNOSTICS 71411-70 PRECISION PRO	N	OF/OI
			ELECT: 2 AA BATTERIES (ALKALINE, LITHIUM, OR NICAD)			

END OF ROOM



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**MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT**

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, EQ (QTY 2)
ROOM NUMBER: 7011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	006264	1	NOTE:	ZZZ - NOTE: (U.S.)	I	OF/OI
			- PLACE HOLDER FOR EQUIPMENT			
2	079188 SHV01	2	SHELVING, WIRE 5 SHELVES;STATIONARY;CHROME;SHELF INLAY (WxDxH) :24x24x74 SPACE: FLOOR CM:61.0x61.0x188.0	INTERMETRO INDUSTRIES CORP. A2424NC/74P A2424NC	I	OF/OI
3	002532 CRT06	2	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	I	OF/OI
4	058498	2	SPHYGMOMANOMETER, ANEROID, MOBILE 5 LEG STAND;CERTIFIED ACCURATE TO 3MMHG;LATEX (WxDxH) :18x18x36 LBS: 12 SPACE: FLOOR CM:45.7x45.7x91.4 KG: 5.50	WELCH ALLYN, INC. 7670-03	I	OF/OI
5	072678 DOP01	2	DOPPLER, FLOW DETECTOR NON-DIRECTIONAL POCKET DOPPLER W/BUILT-IN (WxDxH) :18x18x36 LBS: 2 SPACE: FLOOR CM:45.7x45.7x91.4 KG: 0.90 ELECT: 9V ALKALINE BATTERY	HUNTLEIGH HEALTHCARE D900-P-USA/EZ8 D900 DOPPLEX	I	OF/OI
6	086490	1	OPHTHALMOSCOPE/OTOSCOPE MOBILE STAND; PANOPTIC OPHTHALMOSCOPE;MACROVIEW (WxDxH) :22x22x54 SPACE: FLOOR CM:55.9x55.9x137.2 ELECT: 100-240V;50/60HZ;.18 AMPS MAX	WELCH ALLYN, INC. 77710-82M/ACC GS 777 SERIES	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, EQ (QTY 2)
ROOM NUMBER: 7011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
7	067194	4	I.V. POLE STAINLESS STEEL;5 LEG;3 IN CASTERS;4 HOOK TOP (WxDxH) :23x6x35 LBS: 32 SPACE: FLOOR CM:58.4x15.2x88.9 KG: 14.50	PRYOR PRODUCTS 135	I	OF/OI
8	088643	4	I.V. INFUSION PUMP GENERAL INFUSION PUMP;SINGLE CHANNEL;POLE CLAMP; (WxDxH) :8x8x6 LBS: 10 SPACE: SPACE CM:20.3x20.3x15.2 KG: 4.50 ELECT: 120V;50/60HZ;35W;1A;1 RECHARGEABLE BATTERY LEAD-ACID 6V;POWER CORD:HOSPITAL-GRADE AC CORD 10 FT LONG W/TRANSPARENT PLUG AND RETAINER PLATE	HOSPIRA, INC. 30010 PLUM 360/MEDNET	I	OF/OI
9	087247	4	WALKER, FOLDING, ADULT SIDE WALKER;ALUMINUM;USER WT CAP 300LBS;HT ADJUST (WxDxH) :19x16x36 LBS: 4 SPACE: FLOOR CM:48.3x40.6x91.4 KG: 1.60	PERFORMANCE HEALTHCARE 081561752 HEMI DAYS INVACARE	I	OF/OI
10	066897	4	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0	MEDLINE INDUSTRIES, INC. MDS89668XW	I	OF/OI
11	096810 BRD01	2	BOARD, PATIENT TRANSFER 529 LB CAPACITY;FOR USE IN RADIOLOGY,SURGERY,ICU (WxDxH) :20x70x2 LBS: 8 SPACE: WALL CM:50.8x177.8x5.1 KG: 3.80	SAMARIT 440.0100 HIGHTEC	I	OF/OI
12	078455 BRD03	2	BOARD, PATIENT TRANSFER SURGIBOARD 47X16";TO AND FROM OR TABLE (WxDxH) :16x47x2 SPACE: WALL CM:40.6x119.4x5.1	MCAULEY MEDICAL INC 440.0400 SAMARIT	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, EQ (QTY 2)
ROOM NUMBER: 7011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
13	055330	1	LIFTER, PATIENT INFLATABLE;NYLON OXFORD;TESTED UPT 1100LBS (WxDxH) :39x70x30 SPACE: FLOOR CM:99.1x177.8x76.2 ELECT: 120V/60HZ/1100 WATTS;GROUNDED;14' POWER CORD	HOVERTECH INTERNATIONAL HJ3902/AIR400G/ACC HOVERJACK	I	OF/OI
14	057580 LFT02	1	CART HOLDS HOVERJACK AIR SUPPLY AND LIFT (WxDxH) :25x18x38 LBS: 26 SPACE: FLOOR CM:63.5x45.7x96.5 KG: 11.80	HOVERTECH INTERNATIONAL HJC-100 HOVER JACK	I	OF/OI
15	050708 MON03	1	MONITOR, PHYSIOLOGICAL, TRANSPORT BIPHASIC DEFIBRILLATOR;EXTERNAL PACING;PRINTER (WxDxH) :11x9x11 LBS: 18 SPACE: SPACE CM:27.9x22.9x27.9 KG: 8.20 ELECT: 120V;60HZ;	ZOLL MEDICAL CORPORATION 43510711100124010/AC M CCT/BIPHASIC	I	OF/OI
16	079214 MON04	1	MONITOR, PHYSIOLOGICAL, TRANSPORT TRANSPORT MONITOR WITH MMS, TO INCLUDE: (WxDxH) :13x8x12 LBS: 13 SPACE: SPACE CM:33.0x20.3x30.5 KG: 5.90 ELECT: 100-240V, 50/60HZ, 70W AVERAGE, 1.2AMP PLUMB: NO PLUMBING REQUIRED	PHILIPS MEDICAL SYSTEMS 866060 MX400	I	OF/OI
17	073144	1	TRANSILLUMINATOR VEIN LOCATOR;INFRARED LIGHT;HAND HELD;BATTERY (WxDxH) :24x24x36 SPACE: FLOOR CM:61.0x61.0x91.4	BODIFLOW, LLC AV300 ACCUVEIN	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, EQ (QTY 2)
ROOM NUMBER: 7011

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
18	094909 CRT07	1	CART, UTILITY MULTIPURPOSE CART;800LB CAPACITY;5"WHEELS (WxDxH) :21x31x42 LBS: 44 SPACE: FLOOR CM:53.3x78.7x106.7 KG: 20.00	VERSACART EZTOTE 390 101-390	I	OF/OI
19	074251	4	CRUTCHES ALUMINUM;HAND GRIP;I-BEAM ADJUSTMENT;300LB CAP SPACE: SPACE	MEDLINE INDUSTRIES, INC. QUICK FIT MDS80540	I	OF/OI
20	070331 SCL01	2	SCALE, STAND-ON PORTABLE;DIGITAL READOUT;HANDRAIL/HEIGHT GAUGE (WxDxH) :26x26x78 LBS: 62 SPACE: FLOOR CM:66.0x66.0x198.1 KG: 28.10 ELECT: 120V; 6-D BATTERIES	SCALE-TRONIX DIV. OF WELCH ALLYN 5002/845010/845233	I	OF/OI
21	082590	2	WALKER 4-WHEEL WALKER;8" NON-MARRING CASTERS;300LB CAP (WxDxH) :24x26x37 LBS: 20 SPACE: FLOOR CM:61.0x66.0x94.0 KG: 9.10	PERFORMANCE HEALTHCARE 081576974 ROLLATOR WALKER	I	OF/OI
22	091438	1	CHAIR, SHOWER 500LB USER WT CAP;14-19" HT ADJ SEAT;W/KNOCK DOWN (WxDxH) :18x20x30 LBS: 8 SPACE: FLOOR CM:45.7x50.8x76.2 KG: 3.40	DRIVE MEDICAL 12021KD-1 DELUXE BARI	I	OF/OI
23	074071 LFT01	1	LIFTER, PATIENT MOBILE;400LB CAP;ACTIVE STANDING/TRANSFER AID (WxDxH) :29x33x42 LBS: 65 SPACE: FLOOR CM:73.7x83.8x106.7 KG: 29.50	ARJOHUNTLEIGH SARA STEDY NTB2000	I	OF/OI

END OF ROOM



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MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, LINEN (QTY 2)
ROOM NUMBER: 7012

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	096814 CRT03	2	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70	G.S. MANUFACTURING GSM-G160 -	N	OF/OI
2	078147 CAB01	2	CABINET, WARMING MOBILE;2 COMPARTMENTS;20.6CF;GLASS DOORS;SEPARATE (WxDxH) :32x25x74 LBS: 358 SPACE: FLOOR CM:81.3x63.5x188.0 KG: 162.40 ELECT: 120V;50/60HZ;1PH;15A;1.8KW NEMA 5-20P;20A-125V PLUG HOSPITAL GRADE SPECIFY DOOR HINGE;RIGHT OR LEFT - PLACEHOLDER FOR FULL SIZE, SINGLE COMPARTMENT	PEDIGO PRODUCTS, INC. P-2055 P-2055	N	OF/OI
3	002532 CRT06	2	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	N	OF/OI

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EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, NUTRITION (QTY 2)
ROOM NUMBER: 7013

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	095453	2	CART, FOOD	LAKESIDE MFG. CO.	N	OF/OI
	CRT02		SS;6 TRAY CAPACITY;6"LEDGE SPACING;REMOVABLE DOOR (WxDxH) :33x22x46 LBS: 110 SPACE: FLOOR CM:83.8x55.9x116.9 KG: 49.90	SP-6373 ELITE		
			- SOILED TRAY CART			

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MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: SOILED HOLDING
ROOM NUMBER: 7015

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	094910 COM01	1	COMPACTOR, WASTE 20:1 COMPACT RATION;COMMERCIAL;ELECTROHYDRAULIC (WxDxH) :43x31x90 LBS: 1210 SPACE: FLOOR CM:109.2x78.7x228.6 KG: 548.80 ELECT: 115V;60HZ;15 AMP;SINGLE PHASE;DEDICATED CIRCUIT - ECO-PACK	FOUNTAIN INDUSTRIES ECO-PACK 3600	N	OF/OI
2	079188 SHV01	1	SHELVING, WIRE 5 SHELVES;STATIONARY;CHROME;SHELF INLAY (WxDxH) :24x24x74 SPACE: FLOOR CM:61.0x61.0x188.0	INTERMETRO INDUSTRIES CORP. A2424NC/74P A2424NC	N	OF/OI
3	073358 TRK01	1	TRUCK/BIN, LINEN HORIZONTAL SHELVES;POLYETHYLENE;IMPACT RESISTANT (WxDxH) :48x29x64 SPACE: FLOOR CM:121.9x73.7x162.6	MEESE ORBITRON DUNNE CO. POLY TRUX 90P	N	OF/OI
4	066897	1	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0	MEDLINE INDUSTRIES, INC. MDS89668XW	N	OF/OI
5	096813	1	WASTE RECEPTACLE, STEP-ON 12 GAL;WHITE;FOOT PEDAL OPERATED;FIRE SAFE (WxDxH) :12x12x23 SPACE: FLOOR CM:30.5x30.5x58.4	RUBBERMAID COMM. PRODUCTS RCPST12ERBWHI DEFENDERS	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: SOILED HOLDING
ROOM NUMBER: 7015

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
6	071200	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL 9 GALLON;CLEAR SLIDE TOP;RECYCLED PLASTIC-BLACK (WxDxH) :18x12x19 SPACE: SPACE CM:45.7x30.5x48.3 SPECIFY ACCESSORIES AS SEPARATE LINE ITEMS	BECTON DICKINSON RCRA HAZARDOUS WASTE 305069	N	OF/OI
7	070664	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL CHEMOTHERAPY;PLASTIC;18 GAL;YELLOW;SLIDING LID (WxDxH) :18x13x26 LBS: 8 SPACE: FLOOR CM:45.7x33.0x66.0 KG: 3.60	KENDALL HEALTHCARE, COVIDIEN 8939 CHEMO DISPOSAL	N	OF/OI
8	089948	1	WASTE RECEPTACLE, RECYCLING 23 GALLON;DARK BLUE;RECYCLE SYMBOL;W/ LID (WxDxH) :20x11x35 SPACE: FLOOR CM:50.8x27.9x88.9	RUBBERMAID COMM. PRODUCTS H-1385BLU SLIMJIM 3540-07	N	OF/OI
9	079178	1	WASTE RECEPTACLE CONFIDENTIAL;SIDE PAPER SLOT;KEYPAD LOCK;SHIPS (WxDxH) :11x24x25 LBS: 30 SPACE: FLOOR CM:27.9x61.0x63.5 KG: 13.60	RUBBERMAID COMM. PRODUCTS 9W25 SLIM JIM	N	OF/OI

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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: MEDICATION
ROOM NUMBER: 7016

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	072239	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/VI
	MED02		14.75"LCD MONITOR;KEYBOARD;TOUCHPAD;BIO-ID SCANNER (WxDxH) :23x27x55 LBS: 166 SPACE: FLOOR CM:58.4x68.6x139.7 KG: 75.30	MEDSTATION ES 6 DRAWER MAIN		
			ELECT: 120V;60HZ;3 AMPS MAX EMERGENCY POWER REQUIRED			
			HVAC: 409 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET - NEED TO UPDATE TO ES SERIES			
2	067803	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/VI
	MED04		DOUBLE COLUMN AUXILIARY;8 DOORS (WxDxH) :52x28x80 LBS: 314 SPACE: FLOOR CM:132.1x71.1x203.2 KG: 142.70	DOUBLE COLUMN AUX MEDSTATION 4000		
			ELECT: 120V;60HZ;140 WATTS;DATA DROP REQUIRED			
			HVAC: 362 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET			
3	072243	1	DISPENSER, MEDICATION, AUTOMATED	BD CAREFUSION PYXIS	N	OF/OI
	MED03		SINGLE COLUMN;1 STORAGE SHELF PER DOOR;INTERIOR (WxDxH) :31x28x80 LBS: 314 SPACE: FLOOR CM:78.7x71.1x203.2 KG: 142.40	FOUR DOOR AUXILIARY MEDSTATION ES		
			ELECT: 120V;60HZ;3 AMPS;EMERGENCY POWER REQUIRED			
			HVAC: 222 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET			



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: MEDICATION
ROOM NUMBER: 7016

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
4	096490 REF09	2	REFRIGERATOR, UNDERCOUNTER, MEDICAL GRADE 4.5 CU.FT CAPACITY;PROGRAMMED AUTOMATIC DEFROST (WxDxH) :24x27x34 LBS: 175 SPACE: FLOOR CM:61.0x68.6x86.4 KG: 79.50 ELECT: 115V;60HZ; HVAC: BTU 1596 W/H - STACKED UNITS;1 COMPARTMENT HAZARDOUS, 1 NON-HAZARDOUS	FOLLETT CORPORATION REF5P-00-00/ACC PERFORMANCE +	N	OF/OI
5	096211	1	BRACKET FOR STACKING PERFORMANCE PLUS W/PERFORMANCE PLUS LBS: 8 SPACE: SPACE KG: 3.60	FOLLETT CORPORATION STACKING KIT 01054006	N	OF/OI
6	053907 MED01	2	DISPENSER, MEDICATION, ACCESSORY MED DISPENSING UNIT REFRIGERATOR CONTROL (WxDxH) :3x6x7 LBS: 4 SPACE: SPACE CM:7.6x15.2x17.8 KG: 1.80 ELECT: POWERED FROM MAIN DISPENSER	BD CAREFUSION PYXIS REMOTE MANAGER MSRM	N	OF/VI
7	506535 OSS01	1	OPEN SUPPLY SYSTEM - PAREX SUPPLY SYSTEM, WEIGHT BASED -PROVIDE BACKING ON ALL WALLS WITH NO OUTLETS EXTENDING BEYOND 12" AFF. REQUIRES POWER AND DATA AT CONTROL LOCATION.	ZZZ - GENERIC DESCRIPTIONS	N	OF/VI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: MEDICATION
ROOM NUMBER: 7016

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
8	077862 BIN01	10	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 CM:91.4x2.5x48.3 SPACE: WALL	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI
9	077862 BIN01	2	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 CM:91.4x2.5x48.3 - FOR HAZARDOUS CHEMO BIN SPACE: WALL	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI
10	093412 MVD01	1	MONITOR, VIDEO MXU0299: DISPLAY FLAT PANEL NON-TOUCH PIIC SPACE: SPACE	PHILIPS MEDICAL SYSTEMS MXU0299 866390	N	OF/OI
			- TO INCLUDE SPEAKERS			
11	055704 EWS01	1	ENCLOSURE, WALL, SHARPS 2 OR 5 QT WALL ENCLOSURE (WxDxH) :13x6x12 CM:33.0x15.2x30.5 SPACE: WALL	KENDALL HEALTHCARE, COVIDIEN 85161H IN-ROOM	L	OF/CI
12	093535 DSL02	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL 2GAL;BLACK;WHITE HINGED LID W/PORT;LEAK RESISTANT (WxDxH) :12x10x12 CM:30.5x25.4x30.5 SPACE: WALL	KENDALL HEALTHCARE, COVIDIEN 8602RC/8963 8602RC/8963	N	OF/OI
13	061957 GLV02	2	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 CM:45.7x10.2x22.9 SPACE: WALL	CLINTON INDUSTRIES G-1030 -	N	OF/CI



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MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: MEDICATION
ROOM NUMBER: 7016

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
14	006677	1	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 LBS: 43 SPACE: FLOOR CM:55.9x27.9x76.2 KG: 19.50 SPECIFY COLOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI
15	047636	2	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60 - PLACEHOLDER FOR RED AND BLACK BINS. NEED VENDOR AND MODEL.	RUBBERMAID COMM. PRODUCTS 2544 40 QT	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: NOURISHMENT
ROOM NUMBER: 7018

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	058112 REF02	1	REFRIGERATOR/FREEZER, UPRIGHT 115V;18.2 CF;TOP FREEZER;NON-ICE;LEFT HINGE;WHITE (WxDxH) :30x32x67 LBS: 205 SPACE: FLOOR CM:76.2x81.3x170.2 KG: 93.00 ELECT: 115V;4.5A;60HZ;407 WATTS	SEARS COMMERCIAL SALES KENMORE 46-68972	N	OF/OI
2	087445 ICE01	1	ICE MAKER W/WATER DISPENSER 12# STORAGE CAP;425#/24HR;LEVER;W/O FILTER (WxDxH) :17x24x33 LBS: 199 SPACE: COUNTER CM:43.2x61.0x83.8 KG: 90.30 ELECT: 115VAC/60HZ/1PH/11A/.8KW 8.5' CORD W/NEMA 5-15 HOSPITAL GRADE PLUG HVAC: 5000 BTU/HR CLEARANCES: VENTILATION 6" TOP & RIGHT SIDES SERVICE 12" TOP PLUMB: REFER TO VENDOR TECHNICAL INFORMATION	FOLLETT CORPORATION 12CI425A-L AIR COOLED	N	OF/CI
3	080483 OVE01	1	OVEN, MICROWAVE 1000W;S.S. INTERIOR/EXTERIOR (WxDxH) :21x16x13 LBS: 37 SPACE: COUNTER CM:53.3x40.6x33.0 KG: 16.80 ELECT: 120V;14A/11;1.6KW;15AMP NEMA 15-R RECEPTACLE	SHARP ELECTRONICS CORP. R21LCF R21LCF	N	OF/OI



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: NOURISHMENT
ROOM NUMBER: 7018

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
4	062450	1	COFFEE BREWER PLUMBED;1 LOWER BREWER/2 UPPER WARMERS;200 OZ CAP. (WxDxH) :9x22x19 LBS: 30 SPACE: COUNTER CM:22.9x55.9x48.3 KG: 13.60 ELECT: 120V/15AMPS;TANK HEATER 1425W;TOTAL WATTS 1800 CORD ATTACHED;REQ.2-WIRES PLUS GROUND SERVICE RATED 120V,SINGLE PHASE,60HZ. PLUMB: 20-90 PSI (138-621 KPA).MACHINES SUPPLIED W/ 1/4" MALE FLARE FITTING - TO INCLUDE HOT WATER TAP	BUNN-O-MATIC CORP. AXIOM-15-3-0000/ACC 38700.0000	L	OF/VI
5	051789	1	TOASTER, COMMERCIAL 2-SLOT;CHROME-PLATED CONSTRUCTION;1 3/8"WIDE SLOTS (WxDxH) :14x9x9 LBS: 5 SPACE: COUNTER CM:35.6x22.9x22.9 KG: 2.30 ELECT: 120 VOLTS/8 AMPS/925 WATTS/PHASE 1	WARING PRODUCTS WCT702 -	N	OF/OI
6	094915	1	DISPENSER, FOOD SERVICE, BEVERAGE SOFT DRINK;4 POST MIXING DISPENSING VALVES;LEG KIT (WxDxH) :11x26x28 LBS: 145 SPACE: COUNTER CM:27.9x66.0x71.1 KG: 65.80 ELECT: 120V;60HZ;7 AMPS PLUMB: SS LABELED INLET SYRUP/WATER;3/8"BARB - COORDINATION REQUIRED FOR SYRUP, CO2, ETC UNDER COUNTER	LANCER CORP. CED 500	L	OF/OI
7	061957	1	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 SPACE: WALL CM:45.7x10.2x22.9	CLINTON INDUSTRIES G-1030 -	N	OF/CI



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

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DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: NOURISHMENT
ROOM NUMBER: 7018

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
8	006677	1	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 LBS: 43 SPACE: FLOOR CM:55.9x27.9x76.2 KG: 19.50 SPECIFY COLOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, CART
ROOM NUMBER: 7022

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - IV CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
2	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - RT CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
3	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - FOR LINEN	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
4	092750 MON05	1	MONITOR, VITAL SIGNS NIBP;SPO2;TEMPERATURE;RECORDER;ADULT/PEDIATRIC/ (WxDxH) :25x25x50 LBS: 12 SPACE: FLOOR CM:63.5x63.5x127.0 KG: 5.40 ELECT: 120 VOLT/60 HZ BATTERY CHARGER 10.8-11.1V LITHIUM ION BATTERY - FOR AMBULATION	PHILIPS MEDICAL SYSTEMS 863283/989803176601 SURE SIGNS VS4	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: DICTATION
ROOM NUMBER: 7027

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	096814 CRT03	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70	G.S. MANUFACTURING GSM-G160 -	N	OF/OI
2	078147 CAB01	1	CABINET, WARMING MOBILE;2 COMPARTMENTS;20.6CF;GLASS DOORS;SEPARATE (WxDxH) :32x25x74 LBS: 358 SPACE: FLOOR CM:81.3x63.5x188.0 KG: 162.40 ELECT: 120V;50/60HZ;1PH;15A;1.8KW NEMA 5-20P;20A-125V PLUG HOSPITAL GRADE SPECIFY DOOR HINGE;RIGHT OR LEFT - PLACEHOLDER FOR FULL SIZE, SINGLE COMPARTMENT	PEDIGO PRODUCTS, INC. P-2055 P-2055	N	OF/OI
3	094909 CRT07	1	CART, UTILITY MULTIPURPOSE CART;800LB CAPACITY;5"WHEELS (WxDxH) :21x31x42 LBS: 44 SPACE: FLOOR CM:53.3x78.7x106.7 KG: 20.00	VERSACART EZTOTE 390 101-390	N	OF/OI
4	096814 CRT23	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70 - GOWN	G.S. MANUFACTURING GSM-G160 -	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: CLEAN SUPPLY
ROOM NUMBER: 7028

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	506535 OSS01	1	OPEN SUPPLY SYSTEM	ZZZ - GENERIC DESCRIPTIONS	N	OF/VI
			- PAREX SUPPLY SYSTEM, WEIGHT BASED -PROVIDE BACKING ON ALL WALLS WITH NO OUTLETS EXTENDING BEYOND 12" AFF. REQUIRES POWER AND DATA AT CONTROL LOCATION.			
2	077862 BIN01	30	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 CM:91.4x2.5x48.3	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI
			SPACE: WALL			
3	084658 CRT01	5	CART, CYLINDER, MEDICAL GAS 6 CAPACITY; E/D SIZE;W/HEAVY DUTY 5" CASTERS (WxDxH) :11x16x39 CM:27.9x40.6x99.1	W.T. FARLEY, INC. CR-DC06E-G -	I	OF/OI
			LBS: 22 KG: 10.00			
			SPACE: FLOOR			

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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, CORRIDOR
ROOM NUMBER: 7033

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	002532 CRT06	1	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	I	OF/OI
2	096814 CRT23	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70 - GOWN	G.S. MANUFACTURING GSM-G160 -	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: ALCOVE, EQUIPMENT
ROOM NUMBER: 7035

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	089251 CRT05	1	CART, RESUSCITATION, CARDIAC 4 DRAWER;2 3",1 6",1 9";ADJ DEFIB TRAY;IV POLE (WxDxH) :44x24x52 CM:111.8x61.0x132.1 ELECT: 120V FOR POWER STRIP -DIMENSIONS LISTED DO NOT INCLUDE SIDE ACCESSORIES, IV POLE HEIGHT, OR DEFIBRILLATOR SHELF HEIGHT	INTERMETRO INDUSTRIES CORP. LECCRP3 LIFELINE	E	OF/OI
2	087848 DEF01	1	DEFIBRILLATOR GUIDELINES 2015 - COMPATIBLE, AED W/MANUAL OVERRIDE (WxDxH) :11x13x8 CM:27.9x33.0x20.3 ELECT: 120VAC;60HZ;2AMPS;SEALED LEAD ACID BATTERY INTEGRAL BATTERY CHARGER	ZOLL MEDICAL CORPORATION 30120000001110012 R SERIES ALS	E	OF/OI
3	092325	1	ASPIRATOR VACUUM;5 SETTINGS;30LPM;BUILT IN AC/DC POWER;LED (WxDxH) :13x7x13 CM:33.0x17.8x33.0 ELECT: 100-240VAC;50/60HZ;RECHARGEABLE 12VDC BATTERY	LAERDAL MEDICAL CORP. 78002001/ACC LSU W/CANISTER	E	OF/OI
4	079188 SHV01	1	SHELVING, WIRE 5 SHELVES;STATIONARY;CHROME;SHELF INLAY (WxDxH) :24x24x74 CM:61.0x61.0x188.0	INTERMETRO INDUSTRIES CORP. A2424NC/74P A2424NC	E	OF/OI

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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 7701

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	006264	1	NOTE:	ZZZ - NOTE: (U.S.)	E	OF/OI
			- 18 REGULAR ROOMS, 1 ISOLATION, 1 POSITIVE PRESSURE			
2	086193 BED01	20	BED, MED-SURG 500# CAP;IBED UPGRADEABLE;INBED SCALE;ISOFLEX (WxDxH) :43x93x30 SPACE: FLOOR CM:109.2x236.2x76.2	STRYKER CORP/MEDICAL DIV S3 PX2-3005 S3	E	OF/OI
			- CONFIRM O2 TANK HOLDER QUANTITIES			
3	053630	20	BED ACCESSORIES FULLY DYNAMIC;NON-PWR;PRESSURE MANAGEMENT SURFACE (WxDxH) :35x84x7 LBS: 50 SPACE: SPACE CM:88.9x213.4x17.8 KG: 22.70	B.G. INDUSTRIES ACCUMAX QUANTUM A3-117610-384	E	OF/OI
			ELECT: 110 VOLT/PHASE 1			
4	096840 LFT05	20	LIFTER, PATIENT, ACCESSORY, RAIL 10'STRAIGHT;FOR USE WITH C1000 MOTOR SPACE: CEILING	PRISM MEDICAL 10' STRAIGHT	N	OF/VI
5	087162 MON02	10	MONITOR, PHYSIOLOGICAL 15" TOUCH SCREEN;4 WAVE;ICU S/W;MIB INTERFACE (WxDxH) :13x8x12 LBS: 13 SPACE: WALL CM:33.0x20.3x30.5 KG: 5.90	PHILIPS MEDICAL SYSTEMS MX550 866066	E	OF/OI
			ELECT: 100-240V, 50/60HZ			
			PLUMB: NO PLUMBING REQUIRED			
			- *ARE IN THE PROCESS OF BEING PURCHASED AND WILL RELOCATE WITH ONCOLOGY.			



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 7701

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
6	077835 MNT01	20	MONITOR ACCESSORY, MOUNTING ASSEMBLY VARIABLE HEIGHT MOUNT;TILT/SWIVEL ADJUSTMENT; SPACE: WALL	GCX CORPORATION WA-0011-27 VHM-25	E	OF/OI
			- *ARE IN THE PROCESS OF BEING PURCHASED AND WILL RELOCATE WITH ONCOLOGY.			
7	086984 MON06	10	MONITOR, VITAL SIGNS 8.4"LCD SCREEN;NBP;SPO2;TYMPANIC TEMP;WIRELESS (WxDxH) :11x6x9 LBS: 7 SPACE: WALL CM:27.9x15.2x22.9 KG: 3.10 ELECT: 120 VOLT/60 HZ BATTERY CHARGER LITHIUM ION BATTERY 10.8-11.1V DATA OUTPUT:HL7 FORMAT, VIA ETHERNET PORT SERIAL DATA - *WILL RELOCATE FROM ONCOLOGY	PHILIPS MEDICAL SYSTEMS 863283 SURESIGNS VS4	E	OF/OI
8	093331 WCH01	20	WALL CHANNEL WALL CHANNEL;SEISMIC;19" SPACE: WALL	PHILIPS MEDICAL SYSTEMS MXU175	N	OF/CI
9	028803	20	STAND, MAYO MOBILE;CHROME;HAND HEIGHT ADJUSTABLE 30-40 IN (WxDxH) :13x20x40 LBS: 22 SPACE: FLOOR CM:33.0x50.8x101.6 KG: 10.00 - PLACEHOLDER. SPECS TO BE DETERMINED. MAY NOT NEED 1 PER ROOM.	PEDIGO PRODUCTS, INC. P-65 MOBILE	E	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 7701

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
10	067194	20	I.V. POLE STAINLESS STEEL;5 LEG;3 IN CASTERS;4 HOOK TOP (WxDxH) :23x6x35 LBS: 32 SPACE: FLOOR CM:58.4x15.2x88.9 KG: 14.50 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	PRYOR PRODUCTS 135	E	OF/OI
11	088643	20	I.V. INFUSION PUMP GENERAL INFUSION PUMP;SINGLE CHANNEL;POLE CLAMP; (WxDxH) :8x8x6 LBS: 10 SPACE: SPACE CM:20.3x20.3x15.2 KG: 4.50 ELECT: 120V;50/60HZ;35W;1A;1 RECHARGEABLE BATTERY LEAD-ACID 6V;POWER CORD:HOSPITAL-GRADE AC CORD 10 FT LONG W/TRANSPARENT PLUG AND RETAINER PLATE - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	HOSPIRA, INC. 30010 PLUM 360/MEDNET	E	OF/OI
12	096809	20	PUMP, COMPRESSION DVT;LCD SCREEN;ONE BUTTON START;CARRY HANDLE (WxDxH) :9x8x10 LBS: 9 SPACE: SPACE CM:22.9x20.3x25.4 KG: 4.10 ELECT: 120V/60HZ - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	ARJOHUNTLEIGH ACS900 FLOWTRON	E	OF/OI
13	066897	20	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	MEDLINE INDUSTRIES, INC. MDS89668XW	E	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 7701

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
14	087247	20	WALKER, FOLDING, ADULT SIDE WALKER;ALUMINUM;USER WT CAP 300LBS;HT ADJUST (WxDxH) :19x16x36 LBS: 4 SPACE: FLOOR CM:48.3x40.6x91.4 KG: 1.60 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	PERFORMANCE HEALTHCARE 081561752 HEMI DAYS INVACARE	E	OF/OI
15	063659	20	TABLE, OVERBED SINGLE TOP;W/VANITY;LOW PROFILE U-SHAPED BASE (WxDxH) :21x32x45 LBS: 53 SPACE: FLOOR CM:53.3x81.3x114.3 KG: 24.10 SPECIFY FINISH SPECIFY FINISH: BASE SPECIFY FINISH: EDGE	STRYKER CORP/MEDICAL DIV 3150-000-200 TRU-FIT	E	OF/OI
16	080275	40	REGULATOR, SUCTION, CONTINUOUS & INTERMITTENT 0-200MMHG W/SELECTOR VALVE (OFF,INT,CONT);CANISTER (WxDxH) :4x6x4 LBS: 1 SPACE: WALL CM:10.2x15.2x10.2 KG: 0.50	BOEHRINGER LABORATORIES, INC. 3804/1496/2469 PLATINUM SERIES	E	OF/OI
17	055048	40	FLOWMETER, OXYGEN W/DISS ADAPTOR SPACE: SPACE CONFIRM MEDICAL GAS CONNECTION	AMVEX, DIVISION OF OHIO MEDICAL FM15ODH -	E	OF/OI
18	062114 DSP01	20	DISPENSER EMEBAG DISPENSER (WxDxH) :7x7x7 SPACE: WALL CM:17.8x17.8x17.8	CENTURION MEDICAL PRODUCTS EMED200 EMEBAG	N	OF/CI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 7701

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
19	091196 DSP03	20	DISPENSER, MASK PLEXIGLAS DISPENSER FOR SURGICAL FACE MASK BOXES (WxDxH) :9x6x9 LBS: 2 SPACE: WALL CM:22.9x15.2x22.9 KG: 0.90	MEDLINE INDUSTRIES, INC. NONFM122 NONFM122	N	OF/OI
20	087029 DSL01	20	DISPOSAL CONTAINER, SHARPS W/BACKET LOCKING WALL CABINET FOR SHARPS CONTAINERS;2 GAL (WxDxH) :15x6x14 SPACE: WALL CM:38.1x15.2x35.6	STERICYCLE OC-02-2004 BIO SYSTEMS	L	OF/CI
21	061957 GLV02	20	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 SPACE: WALL CM:45.7x10.2x22.9	CLINTON INDUSTRIES G-1030 -	E	OF/CI
22	058768 HMP01	20	HAMPER, LINEN W/LID;FOOT PEDAL;STEEL FRAME;POWDER COAT FINISH (WxDxH) :21x22x33 SPACE: FLOOR CM:53.3x55.9x83.8 - INSTALLED IN CASEWORK	CENTURION MEDICAL PRODUCTS CX302 MEDIUM	E	OF/OI
23	078043 HMP02	20	HAMPER, LINEN W/LID;FOOT PEDAL OPERATED;TUBULAR CHROME FRAME; (WxDxH) :19x20x26 SPACE: FLOOR CM:48.3x50.8x66.0 - FOR YELLOW BAG CHEMO. INSTALLED IN CASEWORK	CENTURION MEDICAL PRODUCTS CENTURION CX502	E	OF/OI
24	047636	40	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60 - (1) FOR PATIENT ROOM, (1) FOR TOILET	RUBBERMAID COMM. PRODUCTS 2544 40 QT	E	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E7-1 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 20)
ROOM NUMBER: 7701

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
25	085429 RLS01	40	RAIL SYSTEM 7"2" VERTICAL RAIL SYSTEM;SURFACE MOUNT;1 TIER SPACE: WALL	MODULAR SERVICES COMPANY 530-4522	N	CF/CI
			- WITH BASKET, SHELF, AND OTHER ACCESSORIES TO BE DETERMINED.			
26	504469	20	CLOCK	ZZZ - GENERIC DESCRIPTIONS	N	OF/OI
			- SPECIFIED BY OTHERS			

END OF ROOM
END OF DEPARTMENT



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: STAFF LOUNGE
ROOM NUMBER: 7049

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	058112	2	REFRIGERATOR/FREEZER, UPRIGHT REF02 115V;18.2 CF;TOP FREEZER;NON-ICE;LEFT HINGE;WHITE (WxDxH) :30x32x67 LBS: 205 SPACE: FLOOR CM:76.2x81.3x170.2 KG: 93.00 ELECT: 115V;4.5A;60HZ;407 WATTS	SEARS COMMERCIAL SALES KENMORE 46-68972	N	OF/OI
2	080483	2	OVEN, MICROWAVE OVE01 1000W;S.S. INTERIOR/EXTERIOR (WxDxH) :21x16x13 LBS: 37 SPACE: COUNTER CM:53.3x40.6x33.0 KG: 16.80 ELECT: 120V;14A/11;1.6KW;15AMP NEMA 15-R RECEPTACLE	SHARP ELECTRONICS CORP. R21LCF R21LCF	N	OF/OI
3	090442	1	COFFEE BREWER COF02 SINGLE-CUP BREWER FOR COFFEE, TEA, HOT CHOCOLATE (WxDxH) :11x14x14 LBS: 18 SPACE: COUNTER CM:27.9x35.6x35.6 KG: 8.20 ELECT: 120VAC, 1400 WATTS - TO INCLUDE HOT WATER TAP	KEURIG, INC. COMMERCIAL BREWING K150	L	OF/VI
4	051789	1	TOASTER, COMMERCIAL TST01 2-SLOT;CHROME-PLATED CONSTRUCTION;1 3/8"WIDE SLOTS (WxDxH) :14x9x9 LBS: 5 SPACE: COUNTER CM:35.6x22.9x22.9 KG: 2.30 ELECT: 120 VOLTS/8 AMPS/925 WATTS/PHASE 1	WARING PRODUCTS WCT702 -	N	OF/OI
5	006677	2	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 LBS: 43 SPACE: FLOOR CM:55.9x27.9x76.2 KG: 19.50 SPECIFY COLOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

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DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: STAFF LOUNGE
ROOM NUMBER: 7049

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
6	079040	1	CHAIR, MASSAGE 6 MOTOR;2 AIR PUMPS;FULL BODY;RECLINER;LCD SCREEN (WxDxH) :31x53x49 LBS: 220 SPACE: FLOOR CM:78.7x134.6x124.5 KG: 99.80 ELECT: AC 120V;60HZ;20-230W	BEAUTYHEALTH BC-07DH	N	OF/OI

END OF ROOM



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

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DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: CORRIDOR
ROOM NUMBER: 7051

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	093412 MVD01	4	MONITOR, VIDEO MXU0299: DISPLAY FLAT PANEL NON-TOUCH PIIC SPACE: SPACE	PHILIPS MEDICAL SYSTEMS MXU0299 866390	N	OF/OI
2	093331 WCH01	4	WALL CHANNEL WALL CHANNEL;SEISMIC;19" SPACE: WALL	PHILIPS MEDICAL SYSTEMS MXU175	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: PATIENT CARE STATION (QTY 5)
ROOM NUMBER: 7052

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	087769 MON01	1	MONITOR, CENTRAL STATION PIIC IX SURVEILLANCE CENTRAL MONITORING;19" TOUCH (WxDxH) :48x16x16 CM:121.9x40.6x40.6 SPACE: COUNTER	PHILIPS MEDICAL SYSTEMS INTELLIVUE INFO CENTER IX	N	OF/OI
			ELECT: CPU: 115 VAC;60 HZ;5.2 AMPS LCD DISPLAY: 115 VAC;60 HZ;48W TYP. UPS: 115 VAC;60 HZ;5.6 AMPS PRINTER: 117 VAC;60 HZ;5.3 AMPS			
			HVAC: MUST MAINTAIN TEMP AT 62-82 DEGREES F AND NON-CONDENSING RELATIVE HUMIDITY AT 30-60% CPU: 215 BTU/HR UPS: 437 BTU/HR (MAX) DATA CONNECTION REQUIRED, SEE TECH SHEET			
2	505366	1	MONITORING SYSTEM	ZZZ - MONITORING	N	OF/OI
			- ALLOWANCE FOR MONITORING INFRASTRUCTURE			
3	086723 ANA01	2	LAB ANALYZER, GLUCOSE BLOOD GLUCOSE & KETONE MONITORING;BARCODE READER (WxDxH) :3x2x8 CM:7.6x5.1x20.3 LBS: 1 KG: 0.50 SPACE: SPACE	ABBOTT DIAGNOSTICS 71411-70 PRECISION PRO	N	OF/OI
			ELECT: 2 AA BATTERIES (ALKALINE, LITHIUM, OR NICAD)			

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: ALCOVE, CART
ROOM NUMBER: 7058

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - IV CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
2	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - RT CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
3	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - FOR LINEN	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
4	092750 MON05	1	MONITOR, VITAL SIGNS NIBP;SPO2;TEMPERATURE;RECORDER;ADULT/PEDIATRIC/ (WxDxH) :25x25x50 LBS: 12 SPACE: FLOOR CM:63.5x63.5x127.0 KG: 5.40 ELECT: 120 VOLT/60 HZ BATTERY CHARGER 10.8-11.1V LITHIUM ION BATTERY - FOR AMBULATION	PHILIPS MEDICAL SYSTEMS 863283/989803176601 SURE SIGNS VS4	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: ALCOVE, CART
ROOM NUMBER: 7058

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
5	089251 CRT05	1	CART, RESUSCITATION, CARDIAC 4 DRAWER;2 3",1 6",1 9";ADJ DEFIB TRAY;IV POLE (WxDxH) :44x24x52 CM:111.8x61.0x132.1 ELECT: 120V FOR POWER STRIP	INTERMETRO INDUSTRIES CORP. LECCRP3 LIFELINE	N	OF/OI
-DIMENSIONS LISTED DO NOT INCLUDE SIDE ACCESSORIES, IV POLE HEIGHT, OR DEFIBRILLATOR SHELF HEIGHT						
6	087848 DEF01	1	DEFIBRILLATOR GUIDELINES 2015 - COMPATIBLE, AED W/MANUAL OVERRIDE (WxDxH) :11x13x8 CM:27.9x33.0x20.3 ELECT: 120VAC;60HZ;2AMPS;SEALED LEAD ACID BATTERY INTEGRAL BATTERY CHARGER	ZOLL MEDICAL CORPORATION 30120000001110012 R SERIES ALS	N	OF/OI
7	092325	1	ASPIRATOR VACUUM;5 SETTINGS;30LPM;BUILT IN AC/DC POWER;LED (WxDxH) :13x7x13 CM:33.0x17.8x33.0 ELECT: 100-240VAC;50/60HZ;RECHARGEABLE 12VDC BATTERY	LAERDAL MEDICAL CORP. 78002001/ACC LSU W/CANISTER	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: MEDICATION
ROOM NUMBER: 7059

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	072239	1	DISPENSER, MEDICATION, AUTOMATED 14.75"LCD MONITOR;KEYBOARD;TOUCHPAD;BIO-ID SCANNER (WxDxH) :23x27x55 LBS: 166 SPACE: FLOOR CM:58.4x68.6x139.7 KG: 75.30 ELECT: 120V;60HZ;3 AMPS MAX EMERGENCY POWER REQUIRED HVAC: 409 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET - NEED TO UPDATE TO ES SERIES	BD CAREFUSION PYXIS MEDSTATION ES 6 DRAWER MAIN	N	OF/VI
2	072241	1	DISPENSER, MEDICATION, AUTOMATED SLIDE BRACKETS W/DRAWER RELEASE;PLASTIC TOP (WxDxH) :23x47x47 LBS: 133 SPACE: FLOOR CM:58.4x119.4x119.4 KG: 60.30 ELECT: 120V;60HZ;3 AMPS MAX;EMERGENCY POWER REQUIRED HVAC: 222 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET	BD CAREFUSION PYXIS 7 DRAWER AUXILIARY MEDSTATION ES	N	OF/OI
3	072243	1	DISPENSER, MEDICATION, AUTOMATED SINGLE COLUMN;1 STORAGE SHELF PER DOOR;INTERIOR (WxDxH) :31x28x80 LBS: 314 SPACE: FLOOR CM:78.7x71.1x203.2 KG: 142.40 ELECT: 120V;60HZ;3 AMPS;EMERGENCY POWER REQUIRED HVAC: 222 BTU/HR DATA CONNECTION REQUIRED, SEE TECH SHEET	BD CAREFUSION PYXIS FOUR DOOR AUXILIARY MEDSTATION ES	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: MEDICATION
ROOM NUMBER: 7059

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
4	079417 REF01	1	REFRIGERATOR, UPRIGHT, MEDICAL GRADE 115V;SINGLE DOOR;19.7 CF;SS;LED DIG. TEMP;LOCKING (WxDxH) :30x31x80 LBS: 395 SPACE: FLOOR CM:76.2x78.7x203.2 KG: 179.20 ELECT: 115V,60HZ,8.7A HVAC: 950 BTU/HR MAX HEAT REJECTION	FOLLETT CORPORATION REF20-LB-R000 REF20-LB-R000	N	OF/OI
5	053907 MED01	1	DISPENSER, MEDICATION, ACCESSORY MED DISPENSING UNIT REFRIGERATOR CONTROL (WxDxH) :3x6x7 LBS: 4 SPACE: SPACE CM:7.6x15.2x17.8 KG: 1.80 ELECT: POWERED FROM MAIN DISPENSER	BD CAREFUSION PYXIS REMOTE MANAGER MSRM	N	OF/VI
6	506535 OSS01	1	OPEN SUPPLY SYSTEM - PAREX SUPPLY SYSTEM, WEIGHT BASED -PROVIDE BACKING ON ALL WALLS WITH NO OUTLETS EXTENDING BEYOND 12" AFF. REQUIRES POWER AND DATA AT CONTROL LOCATION.	ZZZ - GENERIC DESCRIPTIONS	N	OF/VI
7	077862 BIN01	2	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 SPACE: WALL CM:91.4x2.5x48.3	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: MEDICATION
ROOM NUMBER: 7059

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
8	093412 MVD01	1	MONITOR, VIDEO MXU0299: DISPLAY FLAT PANEL NON-TOUCH PIIC SPACE: SPACE	PHILIPS MEDICAL SYSTEMS MXU0299 866390	N	OF/OI
			- TO INCLUDE SPEAKERS			
9	055704 EWS01	1	ENCLOSURE, WALL, SHARPS 2 OR 5 QT WALL ENCLOSURE (WxDxH) :13x6x12 CM:33.0x15.2x30.5 SPACE: WALL	KENDALL HEALTHCARE, COVIDIEN 85161H IN-ROOM	L	OF/CI
10	093535 DSL02	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL 2GAL;BLACK;WHITE HINGED LID W/PORT;LEAK RESISTANT (WxDxH) :12x10x12 CM:30.5x25.4x30.5 SPACE: WALL	KENDALL HEALTHCARE, COVIDIEN 8602RC/8963 8602RC/8963	N	OF/OI
11	061957 GLV02	1	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 CM:45.7x10.2x22.9 SPACE: WALL	CLINTON INDUSTRIES G-1030 -	N	OF/CI
12	006677	1	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 CM:55.9x27.9x76.2 SPECIFY COLOR LBS: 43 KG: 19.50 SPACE: FLOOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: MEDICATION
ROOM NUMBER: 7059

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
13	047636	2	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60 - PLACEHOLDER FOR RED AND BLACK BINS. NEED VENDOR AND MODEL.	RUBBERMAID COMM. PRODUCTS 2544 40 QT	N	OF/OI

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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: CLEAN SUPPLY
ROOM NUMBER: 7063

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	506535 OSS01	1	OPEN SUPPLY SYSTEM	ZZZ - GENERIC DESCRIPTIONS	N	OF/VI
			- PAREX SUPPLY SYSTEM, WEIGHT BASED -PROVIDE BACKING ON ALL WALLS WITH NO OUTLETS EXTENDING BEYOND 12" AFF. REQUIRES POWER AND DATA AT CONTROL LOCATION.			
2	077862 BIN01	30	BIN, ACCESSORY, PANEL, LOUVERED LOUVERED PANEL;36";STONE (WxDxH) :36x1x19 CM:91.4x2.5x48.3	PAR EXCELLENCE SYSTEMS, INC. 30-636	N	OF/CI
			SPACE: WALL			
3	084658 CRT01	5	CART, CYLINDER, MEDICAL GAS 6 CAPACITY; E/D SIZE;W/HEAVY DUTY 5" CASTERS (WxDxH) :11x16x39 CM:27.9x40.6x99.1	W.T. FARLEY, INC. CR-DC06E-G -	N	OF/OI
			LBS: 22 KG: 10.00			
			SPACE: FLOOR			

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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: SOILED HOLDING
ROOM NUMBER: 7064

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	094910 COM01	1	COMPACTOR, WASTE 20:1 COMPACT RATION;COMMERCIAL;ELECTROHYDRAULIC (WxDxH) :43x31x90 LBS: 1210 SPACE: FLOOR CM:109.2x78.7x228.6 KG: 548.80 ELECT: 115V;60HZ;15 AMP;SINGLE PHASE;DEDICATED CIRCUIT - ECO-PACK	FOUNTAIN INDUSTRIES ECO-PACK 3600	N	OF/OI
2	079188 SHV01	1	SHELVING, WIRE 5 SHELVES;STATIONARY;CHROME;SHELF INLAY (WxDxH) :24x24x74 SPACE: FLOOR CM:61.0x61.0x188.0	INTERMETRO INDUSTRIES CORP. A2424NC/74P A2424NC	N	OF/OI
3	073358 TRK01	1	TRUCK/BIN, LINEN HORIZONTAL SHELVES;POLYETHYLENE;IMPACT RESISTANT (WxDxH) :48x29x64 SPACE: FLOOR CM:121.9x73.7x162.6	MEESE ORBITRON DUNNE CO. POLY TRUX 90P	N	OF/OI
4	066897	1	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0	MEDLINE INDUSTRIES, INC. MDS89668XW	N	OF/OI
5	096813	1	WASTE RECEPTACLE, STEP-ON 12 GAL;WHITE;FOOT PEDAL OPERATED;FIRE SAFE (WxDxH) :12x12x23 SPACE: FLOOR CM:30.5x30.5x58.4	RUBBERMAID COMM. PRODUCTS RCPST12ERBWHI DEFENDERS	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: SOILED HOLDING
ROOM NUMBER: 7064

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
6	071200	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL 9 GALLON;CLEAR SLIDE TOP;RECYCLED PLASTIC-BLACK (WxDxH) :18x12x19 SPACE: SPACE CM:45.7x30.5x48.3 SPECIFY ACCESSORIES AS SEPARATE LINE ITEMS	BECTON DICKINSON RCRA HAZARDOUS WASTE 305069	N	OF/OI
7	070664	1	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL CHEMOTHERAPY;PLASTIC;18 GAL;YELLOW;SLIDING LID (WxDxH) :18x13x26 LBS: 8 SPACE: FLOOR CM:45.7x33.0x66.0 KG: 3.60	KENDALL HEALTHCARE, COVIDIEN 8939 CHEMO DISPOSAL	N	OF/OI
8	089948	1	WASTE RECEPTACLE, RECYCLING 23 GALLON;DARK BLUE;RECYCLE SYMBOL;W/ LID (WxDxH) :20x11x35 SPACE: FLOOR CM:50.8x27.9x88.9	RUBBERMAID COMM. PRODUCTS H-1385BLU SLIMJIM 3540-07	N	OF/OI
9	079178	1	WASTE RECEPTACLE CONFIDENTIAL;SIDE PAPER SLOT;KEYPAD LOCK;SHIPS (WxDxH) :11x24x25 LBS: 30 SPACE: FLOOR CM:27.9x61.0x63.5 KG: 13.60	RUBBERMAID COMM. PRODUCTS 9W25 SLIM JIM	N	OF/OI

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MITCHELL PLANNING
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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: ALCOVE, CART
ROOM NUMBER: 7065

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - IV CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
2	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - RT CART, SPECS TBD.	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
3	092815 CRT04	1	CART, PROCEDURE 24" CART;5-DRWR: 3-3", 1-6", 1-9";BEIGE SHELL/ (WxDxH) :35x26x40 CM:88.9x66.0x101.6 SPACE: FLOOR - FOR LINEN	ARMSTRONG MEDICAL INDUSTRIES PBL-B-24 PREMIER	I	OF/OI
4	092750 MON05	1	MONITOR, VITAL SIGNS NIBP;SPO2;TEMPERATURE;RECORDER;ADULT/PEDIATRIC/ (WxDxH) :25x25x50 LBS: 12 SPACE: FLOOR CM:63.5x63.5x127.0 KG: 5.40 ELECT: 120 VOLT/60 HZ BATTERY CHARGER 10.8-11.1V LITHIUM ION BATTERY - FOR AMBULATION	PHILIPS MEDICAL SYSTEMS 863283/989803176601 SURE SIGNS VS4	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: ALCOVE, CART
ROOM NUMBER: 7065

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
5	089251 CRT05	1	CART, RESUSCITATION, CARDIAC 4 DRAWER;2 3",1 6",1 9";ADJ DEFIB TRAY;IV POLE (WxDxH) :44x24x52 CM:111.8x61.0x132.1 ELECT: 120V FOR POWER STRIP	INTERMETRO INDUSTRIES CORP. LECCRP3 LIFELINE	N	OF/OI
-DIMENSIONS LISTED DO NOT INCLUDE SIDE ACCESSORIES, IV POLE HEIGHT, OR DEFIBRILLATOR SHELF HEIGHT						
6	087848 DEF01	1	DEFIBRILLATOR GUIDELINES 2015 - COMPATIBLE, AED W/MANUAL OVERRIDE (WxDxH) :11x13x8 CM:27.9x33.0x20.3 ELECT: 120VAC;60HZ;2AMPS;SEALED LEAD ACID BATTERY INTEGRAL BATTERY CHARGER	ZOLL MEDICAL CORPORATION 30120000001110012 R SERIES ALS	N	OF/OI
7	092325	1	ASPIRATOR VACUUM;5 SETTINGS;30LPM;BUILT IN AC/DC POWER;LED (WxDxH) :13x7x13 CM:33.0x17.8x33.0 ELECT: 100-240VAC;50/60HZ;RECHARGEABLE 12VDC BATTERY	LAERDAL MEDICAL CORP. 78002001/ACC LSU W/CANISTER	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: EQUIPMENT STORAGE
ROOM NUMBER: 7066

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	006264	1	NOTE:	ZZZ - NOTE: (U.S.)	I	OF/OI
			- PLACE HOLDER FOR EQUIPMENT			
2	014753 SHV02	1	SHELVING, WIRE MOBILE;CHROME;5 SHELF;4 CASTER STEM BRAKES (WxDxH) :51x25x69 LBS: 60 SPACE: FLOOR CM:129.6x63.5x175.3 KG: 27.30	INTERMETRO INDUSTRIES CORP. 2448NC/63UP/ACC. SUPER ERECTA	I	OF/VI
3	002532 CRT06	1	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	I	OF/OI
4	096814 CRT23	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70	G.S. MANUFACTURING GSM-G160 -	I	OF/OI
			- GOWN			
5	058498	1	SPHYGMOMANOMETER, ANEROID, MOBILE 5 LEG STAND;CERTIFIED ACCURATE TO 3MMHG;LATEX (WxDxH) :18x18x36 LBS: 12 SPACE: FLOOR CM:45.7x45.7x91.4 KG: 5.50	WELCH ALLYN, INC. 7670-03	I	OF/OI
6	072678 DOP01	1	DOPPLER, FLOW DETECTOR NON-DIRECTIONAL POCKET DOPPLER W/BUILT-IN (WxDxH) :18x18x36 LBS: 2 SPACE: FLOOR CM:45.7x45.7x91.4 KG: 0.90	HUNTLEIGH HEALTHCARE D900-P-USA/EZ8 D900 DOPPLEX	I	OF/OI
			ELECT: 9V ALKALINE BATTERY			



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: EQUIPMENT STORAGE
ROOM NUMBER: 7066

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
7	086490	1	OPHTHALMOSCOPE/OTOSCOPE MOBILE STAND; PANOPTIC OPHTHALMOSCOPE;MACROVIEW (WxDxH) :22x22x54 SPACE: FLOOR CM:55.9x55.9x137.2 ELECT: 100-240V;50/60HZ;.18 AMPS MAX	WELCH ALLYN, INC. 77710-82M/ACC GS 777 SERIES	I	OF/OI
8	067194	2	I.V. POLE STAINLESS STEEL;5 LEG;3 IN CASTERS;4 HOOK TOP (WxDxH) :23x6x35 LBS: 32 SPACE: FLOOR CM:58.4x15.2x88.9 KG: 14.50	PRYOR PRODUCTS 135	I	OF/OI
9	088643	2	I.V. INFUSION PUMP GENERAL INFUSION PUMP;SINGLE CHANNEL;POLE CLAMP; (WxDxH) :8x8x6 LBS: 10 SPACE: SPACE CM:20.3x20.3x15.2 KG: 4.50 ELECT: 120V;50/60HZ;35W;1A;1 RECHARGEABLE BATTERY LEAD-ACID 6V;POWER CORD:HOSPITAL-GRADE AC CORD 10 FT LONG W/TRANSPARENT PLUG AND RETAINER PLATE	HOSPIRA, INC. 30010 PLUM 360/MEDNET	I	OF/OI
10	087247	2	WALKER, FOLDING, ADULT SIDE WALKER;ALUMINUM;USER WT CAP 300LBS;HT ADJUST (WxDxH) :19x16x36 LBS: 4 SPACE: FLOOR CM:48.3x40.6x91.4 KG: 1.60	PERFORMANCE HEALTHCARE 081561752 HEMI DAYS INVACARE	I	OF/OI
11	066897	2	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0	MEDLINE INDUSTRIES, INC. MDS89668XW	I	OF/OI



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EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: EQUIPMENT STORAGE
ROOM NUMBER: 7066

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
12	096810 BRD01	1	BOARD, PATIENT TRANSFER 529 LB CAPACITY;FOR USE IN RADIOLOGY,SURGERY,ICU (WxDxH) :20x70x2 LBS: 8 SPACE: WALL CM:50.8x177.8x5.1 KG: 3.80	SAMARIT 440.0100 HIGHTEC	I	OF/OI
13	078455 BRD03	1	BOARD, PATIENT TRANSFER SURGIBOARD 47X16";TO AND FROM OR TABLE (WxDxH) :16x47x2 SPACE: WALL CM:40.6x119.4x5.1	MCAULEY MEDICAL INC 440.0400 SAMARIT	I	OF/OI
14	055330	1	LIFTER, PATIENT INFLATABLE;NYLON OXFORD;TESTED UPT 1100LBS (WxDxH) :39x70x30 SPACE: FLOOR CM:99.1x177.8x76.2 ELECT: 120V/60HZ/1100 WATTS;GROUNDED;14' POWER CORD	HOVERTECH INTERNATIONAL HJ3902/AIR400G/ACC HOVERJACK	I	OF/OI
15	057580 LFT02	1	CART HOLDS HOVERJACK AIR SUPPLY AND LIFT (WxDxH) :25x18x38 LBS: 26 SPACE: FLOOR CM:63.5x45.7x96.5 KG: 11.80	HOVERTECH INTERNATIONAL HJC-100 HOVER JACK	I	OF/OI
16	073144	1	TRANSILLUMINATOR VEIN LOCATOR;INFRARED LIGHT;HAND HELD;BATTERY (WxDxH) :24x24x36 SPACE: FLOOR CM:61.0x61.0x91.4	BODIFLOW, LLC AV300 ACCUVEIN	I	OF/OI
17	094909 CRT07	1	CART, UTILITY MULTIPURPOSE CART;800LB CAPACITY;5"WHEELS (WxDxH) :21x31x42 LBS: 44 SPACE: FLOOR CM:53.3x78.7x106.7 KG: 20.00	VERSACART EZTOTE 390 101-390	I	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: EQUIPMENT STORAGE
ROOM NUMBER: 7066

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
18	074251	2	CRUTCHES ALUMINUM;HAND GRIP;I-BEAM ADJUSTMENT;300LB CAP SPACE: SPACE	MEDLINE INDUSTRIES, INC. QUICK FIT MDS80540	I	OF/OI
19	082590	1	WALKER 4-WHEEL WALKER;8" NON-MARRING CASTERS;300LB CAP (WxDxH) :24x26x37 LBS: 20 SPACE: FLOOR CM:61.0x66.0x94.0 KG: 9.10	PERFORMANCE HEALTHCARE 081576974 ROLLATOR WALKER	I	OF/OI
20	091438	1	CHAIR, SHOWER 500LB USER WT CAP;14-19" HT ADJ SEAT;W/KNOCK DOWN (WxDxH) :18x20x30 LBS: 8 SPACE: FLOOR CM:45.7x50.8x76.2 KG: 3.40	DRIVE MEDICAL 12021KD-1 DELUXE BARI	I	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: ALCOVE, NUTRITION
ROOM NUMBER: 7067

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	095453	1	CART, FOOD	LAKESIDE MFG. CO.	N	OF/OI
	CRT02		SS;6 TRAY CAPACITY;6"LEDGE SPACING;REMOVABLE DOOR (WxDxH) :33x22x46 LBS: 110 SPACE: FLOOR CM:83.8x55.9x116.9 KG: 49.90	SP-6373 ELITE		
			- SOILED TRAY CART			

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: ALCOVE, LINEN
ROOM NUMBER: 7068

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	096814 CRT03	1	CART, LINEN SS;3 FIXED SHELF;6" CASTERS (WxDxH) :62x24x70 LBS: 125 SPACE: FLOOR CM:157.5x61.0x177.8 KG: 56.70 - PATIENT LINENS	G.S. MANUFACTURING GSM-G160 -	N	OF/OI
2	078147 CAB01	1	CABINET, WARMING MOBILE;2 COMPARTMENTS;20.6CF;GLASS DOORS;SEPARATE (WxDxH) :32x25x74 LBS: 358 SPACE: FLOOR CM:81.3x63.5x188.0 KG: 162.40 ELECT: 120V;50/60HZ;1PH;15A;1.8KW NEMA 5-20P;20A-125V PLUG HOSPITAL GRADE SPECIFY DOOR HINGE;RIGHT OR LEFT - PLACEHOLDER FOR FULL SIZE, SINGLE COMPARTMENT	PEDIGO PRODUCTS, INC. P-2055 P-2055	N	OF/OI
3	002532 CRT06	1	CART, UTILITY 3 CHROME WIRE SHELVES;5" SWIVEL CASTERS;(2) ONE (WxDxH) :36x24x38 LBS: 39 SPACE: FLOOR CM:91.4x61.0x96.5 KG: 17.70	INTERMETRO INDUSTRIES CORP. 3SPN53DC 3SP SERIES	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: NOURISHMENT
ROOM NUMBER: 7074

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	058112 REF02	1	REFRIGERATOR/FREEZER, UPRIGHT 115V;18.2 CF;TOP FREEZER;NON-ICE;LEFT HINGE;WHITE (WxDxH) :30x32x67 LBS: 205 SPACE: FLOOR CM:76.2x81.3x170.2 KG: 93.00 ELECT: 115V;4.5A;60HZ;407 WATTS	SEARS COMMERCIAL SALES KENMORE 46-68972	N	OF/OI
2	087445 ICE01	1	ICE MAKER W/WATER DISPENSER 12# STORAGE CAP;425#/24HR;LEVER;W/O FILTER (WxDxH) :17x24x33 LBS: 199 SPACE: COUNTER CM:43.2x61.0x83.8 KG: 90.30 ELECT: 115VAC/60HZ/1PH/11A/.8KW 8.5' CORD W/NEMA 5-15 HOSPITAL GRADE PLUG HVAC: 5000 BTU/HR CLEARANCES: VENTILATION 6" TOP & RIGHT SIDES SERVICE 12" TOP PLUMB: REFER TO VENDOR TECHNICAL INFORMATION	FOLLETT CORPORATION 12CI425A-L AIR COOLED	N	OF/CI
3	080483 OVE01	1	OVEN, MICROWAVE 1000W;S.S. INTERIOR/EXTERIOR (WxDxH) :21x16x13 LBS: 37 SPACE: COUNTER CM:53.3x40.6x33.0 KG: 16.80 ELECT: 120V;14A/11;1.6KW;15AMP NEMA 15-R RECEPTACLE	SHARP ELECTRONICS CORP. R21LCF R21LCF	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: NOURISHMENT
ROOM NUMBER: 7074

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
4	062450 COF01	1	COFFEE BREWER PLUMBED;1 LOWER BREWER/2 UPPER WARMERS;200 OZ CAP. (WxDxH) :9x22x19 LBS: 30 SPACE: COUNTER CM:22.9x55.9x48.3 KG: 13.60 ELECT: 120V/15AMPS;TANK HEATER 1425W;TOTAL WATTS 1800 CORD ATTACHED;REQ.2-WIRES PLUS GROUND SERVICE RATED 120V,SINGLE PHASE,60HZ. PLUMB: 20-90 PSI (138-621 KPA).MACHINES SUPPLIED W/ 1/4" MALE FLARE FITTING - TO INCLUDE HOT WATER TAP	BUNN-O-MATIC CORP. AXIOM-15-3-0000/ACC 38700.0000	L	OF/VI
5	051789 TST01	1	TOASTER, COMMERCIAL 2-SLOT;CHROME-PLATED CONSTRUCTION;1 3/8"WIDE SLOTS (WxDxH) :14x9x9 LBS: 5 SPACE: COUNTER CM:35.6x22.9x22.9 KG: 2.30 ELECT: 120 VOLTS/8 AMPS/925 WATTS/PHASE 1	WARING PRODUCTS WCT702 -	N	OF/OI
6	094915 DSP02	1	DISPENSER, FOOD SERVICE, BEVERAGE SOFT DRINK;4 POST MIXING DISPENSING VALVES;LEG KIT (WxDxH) :11x26x28 LBS: 145 SPACE: COUNTER CM:27.9x66.0x71.1 KG: 65.80 ELECT: 120V;60HZ;7 AMPS PLUMB: SS LABELED INLET SYRUP/WATER;3/8"BARB - COORDINATION REQUIRED FOR SYRUP, CO2, ETC UNDER COUNTER	LANCER CORP. CED 500	L	OF/OI
7	061957 GLV02	1	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 SPACE: WALL CM:45.7x10.2x22.9	CLINTON INDUSTRIES G-1030 -	N	OF/CI



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**MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT**

-

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: NOURISHMENT
ROOM NUMBER: 7074

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
8	006677	1	WASTE RECEPTACLE 23 GAL;PLASTIC;RECTANGLE;VENTING CHANNELS (WxDxH) :22x11x30 LBS: 43 SPACE: FLOOR CM:55.9x27.9x76.2 KG: 19.50 SPECIFY COLOR	RUBBERMAID COMM. PRODUCTS 3540/2673-60 SLIM JIM	N	OF/OI

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

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DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: STORAGE, RT TANK
ROOM NUMBER: 7080

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	084658 CRT01	3	CART, CYLINDER, MEDICAL GAS 6 CAPACITY; E/D SIZE; W/HEAVY DUTY 5" CASTERS (WxDxH) :11x16x39 CM:27.9x40.6x99.1	W.T. FARLEY, INC. CR-DC06E-G -	N	OF/OI
			LBS: 22 SPACE: FLOOR			
			KG: 10.00			

END OF ROOM



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 7723

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
1	006264	1	NOTE:	ZZZ - NOTE: (U.S.)	E	OF/OI
			- 10 REGULAR ROOMS, 1 ISOLATION, 1 POSITIVE PRESSURE			
2	086193 BED01	12	BED, MED-SURG 500# CAP;IBED UPGRADEABLE;INBED SCALE;ISOFLEX (WxDxH) :43x93x30 SPACE: FLOOR CM:109.2x236.2x76.2	STRYKER CORP/MEDICAL DIV S3 PX2-3005 S3	E	OF/OI
			- CONFIRM O2 TANK HOLDER QUANTITIES			
3	053630	12	BED ACCESSORIES FULLY DYNAMIC;NON-PWR;PRESSURE MANAGEMENT SURFACE (WxDxH) :35x84x7 LBS: 50 SPACE: SPACE CM:88.9x213.4x17.8 KG: 22.70	B.G. INDUSTRIES ACCUMAX QUANTUM A3-117610-384	E	OF/OI
			ELECT: 110 VOLT/PHASE 1			
4	096840 LFT05	12	LIFTER, PATIENT, ACCESSORY, RAIL 10'STRAIGHT;FOR USE WITH C1000 MOTOR SPACE: CEILING	PRISM MEDICAL 10' STRAIGHT	N	OF/VI
5	086984 MON06	12	MONITOR, VITAL SIGNS 8.4"LCD SCREEN;NBP;SPO2;TYMPANIC TEMP;WIRELESS (WxDxH) :11x6x9 LBS: 7 SPACE: WALL CM:27.9x15.2x22.9 KG: 3.10	PHILIPS MEDICAL SYSTEMS 863283 SURESIGNS VS4	E	OF/OI
			ELECT: 120 VOLT/60 HZ BATTERY CHARGER LITHIUM ION BATTERY 10.8-11.1V DATA OUTPUT:HL7 FORMAT, VIA ETHERNET PORT SERIAL DATA - *WILL RELOCATE FROM ONCOLOGY			



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 7723

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
10	088643	12	I.V. INFUSION PUMP GENERAL INFUSION PUMP;SINGLE CHANNEL;POLE CLAMP; (WxDxH) :8x8x6 LBS: 10 SPACE: SPACE CM:20.3x20.3x15.2 KG: 4.50 ELECT: 120V;50/60HZ;35W;1A;1 RECHARGEABLE BATTERY LEAD-ACID 6V;POWER CORD:HOSPITAL-GRADE AC CORD 10 FT LONG W/TRANSPARENT PLUG AND RETAINER PLATE - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	HOSPIRA, INC. 30010 PLUM 360/MEDNET	E	OF/OI
11	096809	12	PUMP, COMPRESSION DVT;LCD SCREEN;ONE BUTTON START;CARRY HANDLE (WxDxH) :9x8x10 LBS: 9 SPACE: SPACE CM:22.9x20.3x25.4 KG: 4.10 ELECT: 120V/60HZ - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	ARJOHUNTLEIGH ACS900 FLOWTRON	E	OF/OI
12	066897	12	CHAIR, COMMODE BARIATRIC;850 LBS CAP.;DROP ARM;28"SEAT;STEAL (WxDxH) :29x21x26 SPACE: FLOOR CM:73.7x53.3x66.0 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	MEDLINE INDUSTRIES, INC. MDS89668XW	E	OF/OI
13	087247	12	WALKER, FOLDING, ADULT SIDE WALKER;ALUMINUM;USER WT CAP 300LBS;HT ADJUST (WxDxH) :19x16x36 LBS: 4 SPACE: FLOOR CM:48.3x40.6x91.4 KG: 1.60 - CENTRALIZED. PROVIDED ON LIST FOR SPACE AND UTILITY PLANNING ONLY.	PERFORMANCE HEALTHCARE 081561752 HEMI DAYS INVACARE	E	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 7723

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
14	063659	12	TABLE, OVERBED SINGLE TOP;W/VANITY;LOW PROFILE U-SHAPED BASE (WxDxH) :21x32x45 LBS: 53 SPACE: FLOOR CM:53.3x81.3x114.3 KG: 24.10 SPECIFY FINISH SPECIFY FINISH: BASE SPECIFY FINISH: EDGE	STRYKER CORP/MEDICAL DIV 3150-000-200 TRU-FIT	E	OF/OI
15	080275	24	REGULATOR, SUCTION, CONTINUOUS & INTERMITTENT 0-200MMHG W/SELECTOR VALVE (OFF,INT,CONT);CANISTER (WxDxH) :4x6x4 LBS: 1 SPACE: WALL CM:10.2x15.2x10.2 KG: 0.50	BOEHRINGER LABORATORIES, INC. 3804/1496/2469 PLATINUM SERIES	E	OF/OI
16	055048	24	FLOWMETER, OXYGEN W/DISS ADAPTOR SPACE: SPACE CONFIRM MEDICAL GAS CONNECTION	AMVEX, DIVISION OF OHIO MEDICAL FM15ODH -	E	OF/OI
17	062114 DSP01	12	DISPENSER EMEBAG DISPENSER (WxDxH) :7x7x7 SPACE: WALL CM:17.8x17.8x17.8	CENTURION MEDICAL PRODUCTS EMED200 EMEBAG	N	OF/CI
18	091196 DSP03	12	DISPENSER, MASK PLEXIGLAS DISPENSER FOR SURGICAL FACE MASK BOXES (WxDxH) :9x6x9 LBS: 2 SPACE: WALL CM:22.9x15.2x22.9 KG: 0.90	MEDLINE INDUSTRIES, INC. NONFM122 NONFM122	N	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 7723

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
19	087029 DSL01	12	DISPOSAL CONTAINER, SHARPS W/BRACKET LOCKING WALL CABINET FOR SHARPS CONTAINERS;2 GAL (WxDxH) :15x6x14 SPACE: WALL CM:38.1x15.2x35.6	STERICYCLE OC-02-2004 BIO SYSTEMS	L	OF/CI
20	061957 GLV02	12	DISPENSER, GLOVE VERTICAL;TRIPLE;WIRE;POWER COATED FINISH (WxDxH) :18x4x9 SPACE: WALL CM:45.7x10.2x22.9	CLINTON INDUSTRIES G-1030 -	N	OF/CI
21	058768 HMP01	12	HAMPER, LINEN W/LID;FOOT PEDAL;STEEL FRAME;POWDER COAT FINISH (WxDxH) :21x22x33 SPACE: FLOOR CM:53.3x55.9x83.8 - INSTALLED IN CASEWORK	CENTURION MEDICAL PRODUCTS CX302 MEDIUM	E	OF/OI
22	078043 HMP02	12	HAMPER, LINEN W/LID;FOOT PEDAL OPERATED;TUBULAR CHROME FRAME; (WxDxH) :19x20x26 SPACE: FLOOR CM:48.3x50.8x66.0 - FOR YELLOW BAG CHEMO. INSTALLED IN CASEWORK	CENTURION MEDICAL PRODUCTS CENTURION CX502	E	OF/OI
23	047636	24	WASTE RECEPTACLE 40 QT;RECTANGULAR;FIRE RESISTANT;FIBERGLASS;BEIGE (WxDxH) :12x15x20 LBS: 8 SPACE: FLOOR CM:30.5x38.1x50.8 KG: 3.60 - (1) FOR PATIENT ROOM, (1) FOR TOILET	RUBBERMAID COMM. PRODUCTS 2544 40 QT	E	OF/OI



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MITCHELL PLANNING
MAINE MEDICAL CENTER
EQUIPMENT REPORT BY DEPARTMENT

-

DEPARTMENT: E7-2 ONCOLOGY
ROOM NAME: PATIENT ROOM (QTY 12)
ROOM NUMBER: 7723

LINE	ID #	QTY	GENERIC	MANUFACTURER	STATUS	RESP
24	085429 RLS01	24	RAIL SYSTEM 7"2" VERTICAL RAIL SYSTEM;SURFACE MOUNT;1 TIER SPACE: WALL	MODULAR SERVICES COMPANY 530-4522	N	CF/CI
			- WITH BASKET, SHELF, AND OTHER ACCESSORIES TO BE DETERMINED.			
25	504469	12	CLOCK	ZZZ - GENERIC DESCRIPTIONS	N	OF/OI
			- SPECIFIED BY OTHERS			

END OF ROOM
END OF DEPARTMENT

END OF REPORT

Mitchell

Mitchell Associates

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**MAINE MEDICAL CENTER
Medical Equipment Cutbook
01/25/2018**

FOR DESIGN PURPOSES ONLY NOT FOR CONSTRUCTION		REVIEW	REVIEW	REVIEW
E-NUMBER	GENERIC DESCRIPTION	1/25/2018	12/14/2017	12/8/2017
ANA01	LAB ANALYZER, GLUCOSE			
BED01	BED, MED-SURG			
BIN01	BIN, ACCESSORY, PANEL, LOUVERED			
BRD01	BOARD, PATIENT TRANSFER	UPDATED		
BRD02	BOARD, PATIENT TRANSFER	DELETED		
BRD03	BOARD, PATIENT TRANSFER	ADDED		
CAB01	CABINET, WARMING			
COF01	COFFEE BREWER			ADDED
COF02	COFFEE BREWER			
COM01	COMPACTOR, WASTE			
CRT01	CART, CYLINDER, MEDICAL GAS			
CRT02	CART, FOOD			
CRT03	CART, LINEN	UPDATED		
CRT04	CART, PROCEDURE			
CRT05	CART, RESUSCITATION, CARDIAC			
CRT06	CART, UTILITY			
CRT07	CART, UTILITY			ADDED
CRT23	CART, LINEN	UPDATED		
DEF01	DEFIBRILLATOR			
DOP01	DOPPLER, FLOW DETECTOR			
DSL01	DISPOSAL CONTAINER, SHARPS W/BACKET			ADDED
DSL02	DISPOSAL CONTAINER, WASTE, PHARMACEUTICAL			
DSP01	DISPENSER			
DSP02	DISPENSER, FOOD SERVICE, BEVERAGE			
DSP03	DISPENSER, MASK			
ECG01	ELECTROCARDIOGRAPH			
EWS01	ENCLOSURE, WALL, SHARPS		DELETED	
GLV01	DISPENSER, GLOVE	DELETED		
GLV02	DISPENSER, GLOVE	UPDATED	ADDED	
HMP01	HAMPER, LINEN		ADDED	
HMP02	HAMPER, LINEN			
ICE01	ICE MAKER W/WATER DISPENSER	UPDATED		
IMU01	IMAGING, ULTRASOUND SCANNER			UPDATED
IMU02	IMAGING, ULTRASOUND SCANNER			
LFT01	LIFTER, PATIENT			
LFT02	CART			
LFT03	LIFTER, PATIENT, CEILING MOUNTED	DELETED		
LFT05	LIFTER, PATIENT, ACCESSORY, RAIL	ADDED		ADDED
MED01	DISPENSER, MEDICATION, ACCESSORY	UPDATED		
MED02	DISPENSER, MEDICATION, AUTOMATED	UPDATED		
MED03	DISPENSER, MEDICATION, AUTOMATED	ADDED		
MED04	DISPENSER, MEDICATION, AUTOMATED	UPDATED		
MED05	DISPENSER, MEDICATION, AUTOMATED			

E-NUMBER	GENERIC DESCRIPTION	1/25/2018	12/14/2017	12/8/2017
MNT01	MONITOR ACCESSORY, MOUNTING ASSEMBLY			
MON01	MONITOR, CENTRAL STATION			
MON02	MONITOR, PHYSIOLOGICAL			
MON03	MONITOR, PHYSIOLOGICAL, TRANSPORT			
MON04	MONITOR, PHYSIOLOGICAL, TRANSPORT			
MON05	MONITOR, VITAL SIGNS			
MON06	MONITOR, VITAL SIGNS	ADDED		UPDATED
MON17	ALLOWANCE, MONITORING, TELEMETRY	ADDED		
MVD01	MONITOR, VIDEO			
OSS01	OPEN SUPPLY SYSTEM			
OVE01	OVEN, MICROWAVE	UPDATED		
REF01	REFRIGERATOR, UPRIGHT, MEDICAL GRADE			
REF02	REFRIGERATOR/FREEZER, UPRIGHT			
REF09	REFRIGERATOR, UNDERCOUNTER, MEDICAL GRADE	ADDED		
RLS01	RAIL SYSTEM			
SCL01	SCALE, STAND-ON			
SHV01	SHELVING, WIRE			
SHV02	SHELVING, WIRE			
TRK01	TRUCK/BIN, LINEN			
TST01	TOASTER, COMMERCIAL	UPDATED		
WCH01	WALL CHANNEL			
WCH02	WALL CHANNEL	DELETED		



FREESTYLE PRECISION PRO SYSTEM

Specifications

FreeStyle Precision Pro Meter

Dimension and Weight Specifications:

Length:	7.85 in ± .08 in (19.94 cm ±2 mm)
Width:	2.93 in ± .08 in (7.45 cm ±2 mm)
Thickness:	1.92 in ± .08 in (4.92 cm ±2 mm)
Weight:	10.58 ounces ± .51 ounces (300 grams ±15 grams)

Power Source:

Two standard alkaline, lithium, or NiCad AA batteries or nickel-metal hydride (NiMH) rechargeable batteries. Battery performance is a function of how often the meter is used and the duration time that testing is conducted. The average lithium battery life is approximately 30 days, based on an average of 9 tests per day and meter being shut off within 2 minutes if it is not being used (depending on barcode usage).

Meter Life Exposed to Cleaning/Disinfection:

The meter has a mean service life of 3 years, which is 10,950 disinfection cycles (equivalent to pre-cleaning and disinfecting 10 times a day over the 3 year service life of the meter).

Memory:

Patient Test Results: 2,500

Control Test Results: 1,000

Operator IDs: 6,000

Test Strip Lots: 36 (18 Glucose, 18 Ketone)

Proficiency Test Results: 20

Glucose Linearity Test Results: 20 Results (1 panel, 5 levels, 4 replicates per level)

Ketone Linearity Test Results: 20 Results (1 panel, 5 levels, 4 replicates per level)

Patient IDs: 6,000 patient records (name, gender, date of birth)

Environmental Specifications:

Product is intended for indoor use only.

Meter Operating Temperature:	59 °F to 104 °F (15 °C to 40 °C ± 1°C)
Meter Storage Temperature:	-4 °F to 122 °F (-20 °C to 50 °C ± 1°C)
Altitude:	Reference the test strip instructions for use.
Humidity:	From 10% to 90% ± 3%RH noncondensing
Rated Pollution Degree:	2

Wireless Specifications

The optional wireless function requires a WiFi enabled facility. If your agreement with Abbott Diabetes Care Inc. includes wireless functionality on the FreeStyle Precision Pro system, your system administrator must enable both the data management system and the individual meters for wireless functionality. Details for enabling the wireless function are described in the Wireless Set-Up Utility CD (optional).

See the meter wireless specifications in the FreeStyle Precision Pro Wireless Setup Utility User's Guide.

EQUIP# BED01

S3[®] MedSurg Bed
with StayPut[®] Frame

REF 3005

stryker[®]

Operations Manual



This manual is designed to assist you with the operation or maintenance of the Stryker S3[®] MedSurg Bed, Model 3005. Read this manual thoroughly before operating or maintaining this product. Establish methods and procedures for educating and training staff on the safe operation or maintenance of this product.

 **WARNING**

- Improper usage of the product can cause injury to the patient or operator. Operate the product only as described in this manual.
 - Do not modify the product or any components of the product. Modifying the product can cause unpredictable operation resulting in injury to patient or operator. Modifying the product also voids its warranty.
-

Notes

- This manual should be considered a permanent part of the product and should remain with the product even if the product is subsequently sold.
- Stryker continually seeks advancements in product design and quality. Therefore, while this manual contains the most current product information available at the time of printing, there may be minor discrepancies between your product and this manual. If you have any questions, please contact Stryker Customer Service or Technical Support at 1-800-327- 0770.

INTENDED USE – STRYKER S3[®] MEDSURG BED, MODEL 3005

The S3[®] MedSurg Bed, Model 3005 is intended to support and transport patients within the Med/Surg and Critical Care hospital environments. The S3[®] MedSurg Bed, Model 3005 is typically used in pre-op, post-op and recovery areas of hospital facilities. The intended user for this product is both Health Care Providers (HCPs: nurses, nurses' aides, and medical doctors) and human patients. Lockout features may limit patient accessible controls. This product is to be used in combination with a patient sleep surface. The bed has fowler, gatch and lift articulation capabilities, which aide in the adjustment of surface contour, angle, and height. The product offers various options, outlined in the product operations and maintenance manuals, including but not limited to *iBed*[®] Awareness, scale, 110V option, IV pole, defibrillator tray, etc. *iBed*[®] Awareness allows users to set various bed parameters to monitor bed positioning. Chaperone[®] Bed Exit system alerts inform users as to patient movement within a specific zone(s) on a patient surface. Both the *iBed* Awareness and Chaperone[®] Bed Exit system provide both visual and audible alerts. The bed may be equipped with an integrated scale intended to weigh the patient in bed. The scale output is not intended to be used to determine diagnosis or treatment.

The intended patient population for the S3[®] MedSurg Bed, Model 3005 is the following:

- The product should be used with patients upwards of 50 lb and have a maximum safe working load of 500 lb
- The patient must be at least 2 years old
- The patient must be less than 84 in without a bed extender OR 96 in with a bed extender

The product is not intended to support more than one individual at a time.


INTENDED USE – *iBED*[®] WIRELESS WITH *iBED*[®] AWARENESS

The intended use for the *iBed*[®] Wireless (with *iBed*[®] Awareness) is to assist clinical staff to monitor bed parameters on specific Stryker beds. The desired bed parameters will be set by clinicians at the bedside. The *iBed*[®] Wireless software is intended to be used only with specifically enabled Stryker beds that have been verified and validated with the *iBed*[®] Wireless software, and is not intended to provide bed status information for non-Stryker beds. The *iBed*[®] Wireless software is not intended to communicate any patient status information, nor to permanently store any type of data. The *iBed*[®] Wireless with *iBed*[®] Awareness System is not intended to provide automated treatment decisions or as a substitute for professional healthcare judgment. The *iBed*[®] Wireless with *iBed*[®] Awareness System is not a replacement or substitute for vital signs monitoring or alert equipment. All patient medical diagnosis and treatment are to be performed under direct supervision and oversight of an appropriate health care professional.

EXPECTED SERVICE LIFE

The S3® MedSurg Bed, Model 3005 has an expected service life of 10 years under normal use conditions and with appropriate periodic maintenance as described in the maintenance manual for each device.

SPECIFICATIONS

	Safe Working Load		500 lb	227 kg
	Note: Safe Working Load indicates the sum of the patient, mattress, and accessory weight.			
Bed Weight			570 lb	259 kg
Scale System Capacity (optional equipment). Loads weighing up to			500 lb	227 kg
Scale System Accuracy (optional equipment)			± 3 pounds for patients weighing 50 to 100 pounds ± 3% of the total patient weight for patients weighing 100 to 500 pounds	
Overall Length/Width		Siderails Up	93 in x 41-1/2 in	236.2 cm x 105.41 cm
		Siderails Down	93 in x 39-1/2 in	236.2 cm x 100.3 cm
Patient Sleep Surface			84 in x 35 in	213.4 cm x 88.9 cm
Bed Height to Top of Seat Litter - 6 in Casters			16 in to 30 in ±0.5	40.6 cm to 76.2 cm
Litter Platform to Top of Siderail	Full Up	Head End Siderail	15 in	38.1 cm
	Full Up	Foot End Siderail	15-1/2 in	39.37 cm
Space Between Siderails (Full Up)			2-1/4 in	5.72 cm
Knee Gatch Angle			0° to 40°	
Fowler Angle			0° to 60° (±5° at all angles except 30°, ±3° at 30°)	
Trendelenburg/Reverse Trendelenburg			+12° (+1°/-2°) to -10° (± 1°)	
Electrical Requirements - all electrical requirements meet UL 60601 specifications.			120VAC, 60Hz, 8A	
iBed® Wireless (option)			802.11 b/g, 2.4 GHz <ul style="list-style-type: none"> Minimum Operational Signal Strength: -65 dB Supported Securities: <ul style="list-style-type: none"> WEP WPA-PSK (TKIP) WPA2-PSK (CCMP/AES) Supports IPv4 and DHCPv4 802.1x <ul style="list-style-type: none"> MS-CHAPv2 	
Outlet Option			110VAC, 60Hz, 10A	
Duty Cycle			1 minute 45 seconds ON, 30 minutes OFF	
StayPut® Bed Frame Technology			Maintains the relative location of the patient when the head of the bed is raised. This helps reduce the need for patient repositioning once the bed adjustment is made. Patients also remain in close proximity to bedside belongings as the bed is articulated.	

MATTRESS SPECIFICATIONS

Thickness	6 in	15.2 cm
Width	>= 35 in	>= 88.9 cm
Length	>= 84 in	>= 213.4 cm
ILD	80 lb	36.3 kg

The above stated mattress specifications assist in ensuring the product conforms to HBSW and IEC specifications.

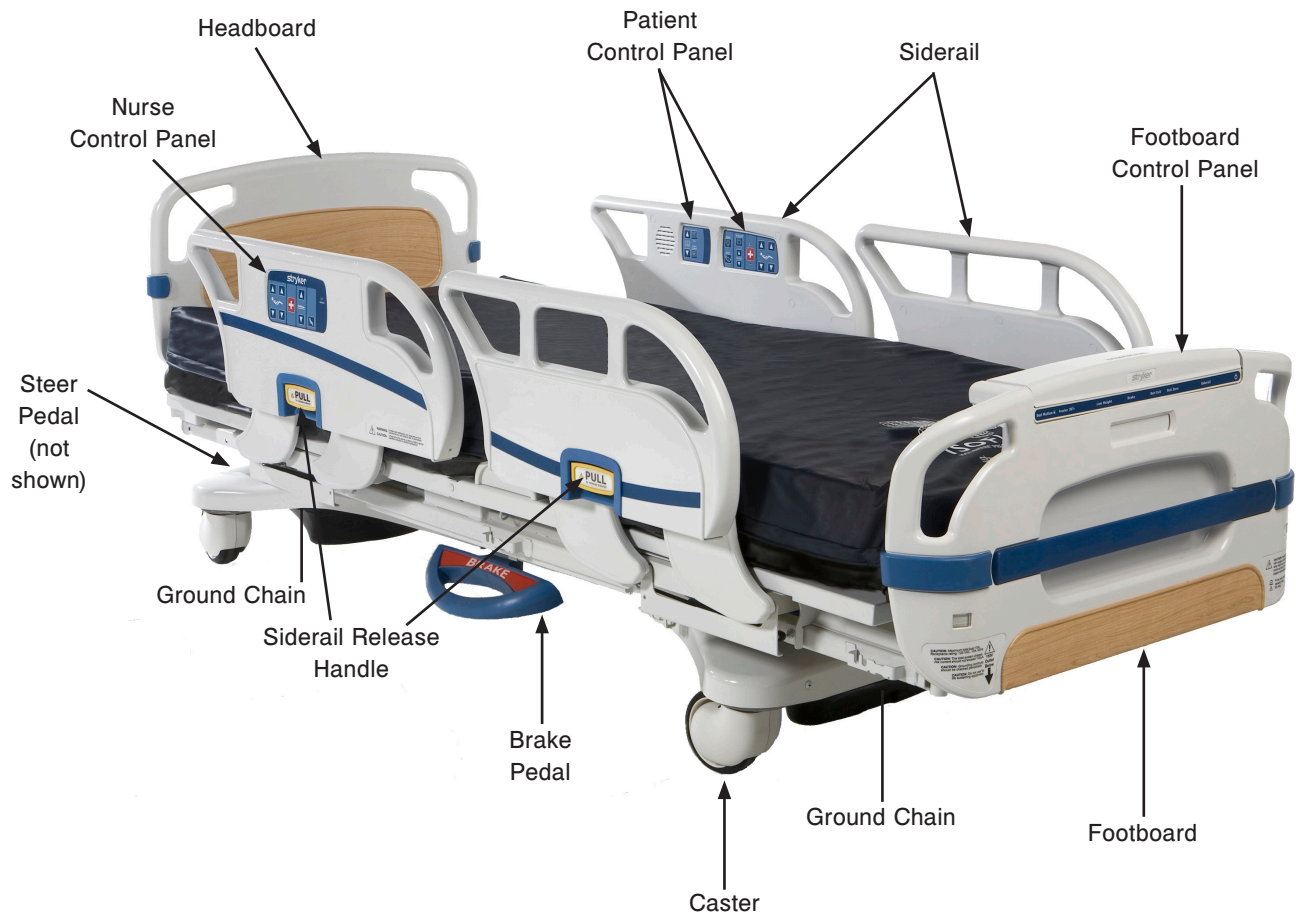
ENVIRONMENTAL CONDITIONS

Environmental Conditions	Operation	Storage and Transportation
Ambient Temperature	<p>50 °F (10 °C) 104 °F (40 °C)</p>	<p>-22 °F (-30 °C) 140 °F (60 °C)</p>
Relative Humidity (Non-Condensing)	<p>30% 75%</p>	<p>10% 95%</p>
Atmospheric Pressure	<p>700 hPa 1060 hPa</p>	<p>500 hPa 1060 hPa</p>

Stryker reserves the right to change specifications without notice.

Specifications listed are approximate and may vary slightly from unit to unit or by power supply fluctuations.

PRODUCT ILLUSTRATION



CONTACT INFORMATION

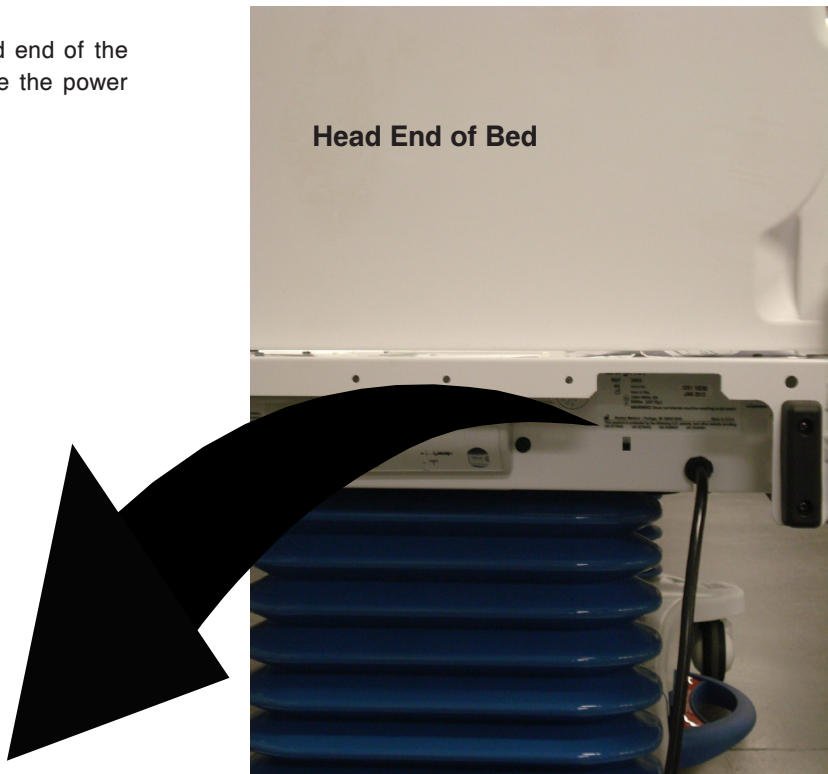
Contact Stryker Customer Service or Technical Support at 1-800-327-0770.

Stryker Medical
3800 E. Centre Avenue
Portage, Michigan 49002
USA

Please have the serial number (A) of your Stryker product available when calling Stryker Customer Service or Technical Support. Include the serial number in all written communication.

SERIAL NUMBER LOCATION

The serial number is located at the head end of the bed just below the headboard and above the power cord where it comes out from the frame.



A →

stryker [®]			IPX4	
REF	3005S3			87VL
SN	Serial No.			MEDICAL
	Date of Mfg.			ELECTRICAL
	120V~60Hz, 8A			EQUIPMENT
	500lbs. [227 Kg.]			UL 60601-1
	WARNING: Does not tolerate machine was hing or jet was h!			CAN/CSA C22.2
	Rated Duty Cycle: 1min. 45 sec. On / 30 min. Off			NO.601.1
	Stryker Medical - Portage, MI 49002-5826			Made in U.S.A.
	This product is protected by the following U.S. patents, and other patents pending:			
	US 5172442	US 5 276432	US 5 329657	US 5 343581

PAR Storage

Louver

Louver Specifications

Size	Akro-Mils	Extruded	Herman-Miller
Dimensions	36" W x 18" H 18" W x 18" H	36" W x 8" H	36" W x 12" H
Capacity*	Unspecified 25 #/SF Max	40kg max	20 kg max

* Capacity is maximum recommended working load with properly engineered and installed support and anchoring system.

Herman-Miller Cart Base

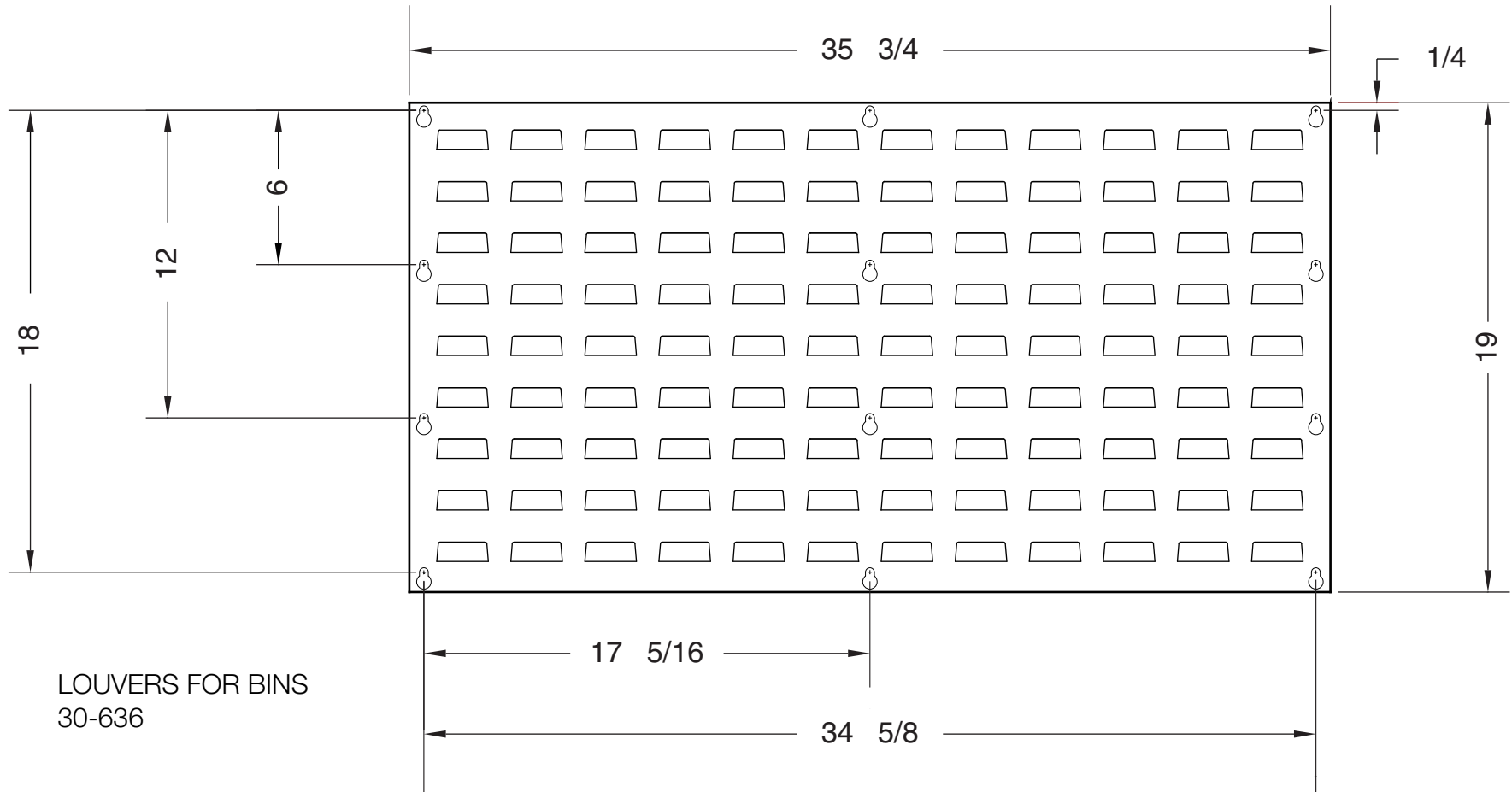
Cart Base Specifications

Size	36"	54"	72"
Base Dimensions	43" X 28.25"	63" X 28.25"	81" X 28.25"
Includes Bumpers			
Panel Configuration	(1) 36" panel or (2) 18" panels	(1) 18" panel and (1) 26" panel	(2) 36" panels

Touch Screen Monitor

Touch Screen Specifications (Recommended)

LCD Screen	17" TFT LCD Recommended
Interface	Serial (USB preferred)
Mounting	Table Top or Wall Mount (preferred)



SAMARIT

safe patient moving & handling



SAMARIT "no lift" Transfer Systems

NEW

Rollbord™

HIGHTEC

For
HEAVY
use!

The safe way to transfer patients

A legal requirement in some countries, taken for granted in others – working conditions should be as comfortable as possible. Healthcare workers should avoid lifting when transferring patients. **SAMARIT Products** assist with transfer, without the need to lift. The products are designed to facilitate the transfer without using a lot of effort, thus making the work easier for the carers and kinder to their backs.

FOR DESIGN ONLY, NOT FOR CONSTRUCTION

The hightec Rollbord series

STANDARD

foldable



*SWL: 240 kg
*SWL: 529 lbs

Suitable for radiology, operating theatre, intensive care units and all special wards.

Size: 177 x 50 cm / 89 x 50 cm, 2.7 kg
70 x 20 inch / 35 x 20 inch foldable

Anti-bacteriologic, anti-fungic, flame retardant, security endings, skin friendly coating and easy to clean.

Order No. 440.0100

ICU-BARIATRIC

non-foldable



*SWL: 310 kg
*SWL: 684 lbs

Suitable for Intensive Care (ICU) nursing services, on air and decubitus mattresses.

Size: 177 x 50 cm, 3.8 kg
70 x 20 inch

Anti-bacteriologic, anti-fungic, flame retardant, security endings, skin friendly coating and easy to clean.

Order No. 440.0200

MINI-GYN

non-foldable



*SWL: 180 kg
*SWL: 397 lbs

Suitable for urology operating theatres, gynaecology operating theatres, wake-up stations and emergencies.

Size: 91 x 50 cm, 1.4 kg
36 x 20 inch

Anti-bacteriologic, anti-fungic, flame retardant, security endings, skin friendly coating and easy to clean.

Order No. 440.0300

*SWL = Safe Weight Load

5 different models to suit every hospital application

- High performance
- Radioluscent
- Non-toxic materials
- Anti-bacterially surface
- Safe and comfortable for patients
- Prevents back injuries to care workers
- Skin-friendly (no latex)
- Easy to clean and disinfect – hygiene approved
- Disposable covers available
- Tear resistant nylon cloth
- Bridges gaps up to 20 cm
- Lightweight, easy suspendable

COVER DISPENSER

Suitable for all Rollbord models



Wall mount

Size: 15 x 66 x 14 cm
0.6 x 2.6 x 0.55 inch

Order No. 440.1088

SURGIBOARD

non-foldable



*SWL: 180 kg
*SWL: 397 lbs

Suitable for operating theatre, X-Ray, various wards (replaces aluminium rollers).

Size: 120 x 40 cm, 1.5 kg
50 x 16 inch

Anti-bacteriologic, anti-fungic, flame retardant, security endings, skin friendly coating and easy to clean.

Order No. 440.0400

MRI/CT

foldable

Option: Bag



*SWL: 200 kg
*SWL: 440 lbs

Suitable for transfer of injured patients on/ from stretcher.

Size: 177 x 40 cm, 2.5 kg
70 x 16 inch / 35 x 16 inch foldable

Anti-bacteriologic, anti-fungic, flame retardant, security endings, skin friendly coating and easy to clean.

Order No. 440.0500

DISPOSABLE COVER

Suitable for all Rollbord models



To protect Rollbords from blood and dirt. Size:

200 cm / 135 cm, Ø 60 (tube)

200 cm / 79 inch **Order No. 440.1000**

135 cm / 53 inch **Order No. 440.1400**

SAMARIT "no lift" Transfer Systems make day-to-day work with patients easier

SAMARIT also gives comfort and security to patients

In hospitals, where patients may need to be transferred carefully several times a day, **SAMARIT** makes life easier for the carer and more comfortable for patients.

SAMARIT Transfer Systems – a great help to healthcare professionals – worldwide!

If you imagine how many transfers are carried out every day in hospitals and within communities then you will appreciate the true value of the original **SAMARIT** systems. In fact, over 150'000 **SAMARIT** Transfer Systems are being used by nursing professionals working worldwide.

All of them find that their work is made easier when using **SAMARIT** products.

different model weighs 1.4 - 3 kg and can be set up quickly – anywhere

FOR DESIGN ONLY, NOT FOR CONSTRUCTION



The safe and secure way to transfer patients

Rollbord

EQUIP# BRD01

HIGHTEC



Turn the patient onto the side, slide the board under the body and return the patient to the original position.



Gently push the patient at the shoulder and hip, without applying force, and transfer.



Turn the patient onto the side. Remove the Rollbord starting at the feet.

Environmentally friendly

material* SAMARIT transfer aids are made of ecologically safe materials. They can be disposed of in an environmentally friendly manner and if a fire should occur they do not produce toxic fumes.

* Teflonised sliding fabric around a polyethylene foam core, coated polyester cloth, PE security endings.

High quality standards

SAMARIT transfer aids have:

- CE mark
- Design patents

Easy cleaning

The Rollbord can be cleaned best with *SamaClean Wipes* or any hospital disinfectant. For anticipated soiled conditions use the Rollbord disposable cover. It covers ends of Rollbord and allows any residue to be folded untouched into the cover, leaving a clean surface. Repairs can only be carried out by authorized personnel (warranty).

www.samarit.com

Ask for separate brochures for the other products in the SAMARIT range!



SAMARIT Rollbord ECOLite



SAMARIT Rollbord H-Line



SAMARIT Transglide



SAMARIT Nursing Aids

Download your language from our website or ask your local distributor.

SAMARIT
safe patient moving & handling

Samarit Medical AG

Gewerbestrasse 12
CH-8132 Egg, Schweiz

Tel.: +41 44 918 10 11 Fax: +41 44 918 24 39

e-mail: info@samarit.com - www.samarit.com

FOR DESIGN ONLY, NOT FOR CONSTRUCTION

Safe Patient Handling Solutions

MCAULEY MEDICAL, INC.

SAMARIT
Improving patient care

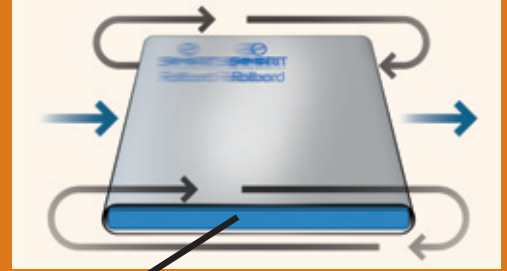
Rollbord

This is the ORIGINAL, state-of-the-art Rollbord, in use in thousands of hospitals all over the world.

Don't be misled by imitators - insist on these features:
Anti-Microbial • 3-Year Warranty • Anti-Static • MRI Safe
Molded Plastic Handles • Flame Retardant • NO Weight Limit



See short in-service videos on our website.



SOFT FOAM CORE - NO ROLLERS

OUR UNIQUE PATENTED CONVEYOR BELT ACTION CARRIES PATIENT FROM SURFACE TO SURFACE, POWERED ONLY BY A GENTLE "PUSH"

Surgibord
Part # 440.0400
47" x 16"

Mini-Gyn
Part # 440.0300
32" x 20"

Bariatric
Part # 440.0200, 70" x 20"



Disposable Cover Sheet
Long Part # 440.1000 80" x 24"
Short Part # 440.1400 57" x 20"

Standard
Part # 440.0100
70" x 20"

MRI
Part # 440.0500, 70" x 16"

Ambulance
Part # 440.0900, 60" x 16"

Our Ambulance Rollbord was designed specifically to meet the needs of Emergency Response Professionals, reducing back injuries AND workers comp costs.

Lateral transfer without lifting No lifting required, staff back injury is reduced. The result can be savings on both workers compensation and insurance.

Lateral transfer without noise Patients are not disturbed, annoyed or frightened by noise associated with airflow systems.

Over 200,000 Rollbords sold worldwide for over 28 years A proven effective and widely accepted product in thousands of hospitals around the world.

Priced well below other technologies You can purchase a Rollbord for every room in your facility at a fraction of the cost of mechanical devices.

Patient rides on a soft surface Patient is comfortable with far less risk of skin tears, injury, bruising and agitation associated with transfers on slide sheets.

Rollbord bridges the "Gap" Older airflow technology requires a bridge to cover gaps between surfaces. Slide sheet transfers across gaps are painful to the patient. Rollbord automatically bridges the gap and the patient feels nothing.

Environmentally Friendly

• No Electricity • NO Laundry/Detergents required

- Various sizes available
- No air holes, No Velcro
- Anti-Microbial treated material

Infection control helps prevent MRSA and other infectious microbes, and is easily wiped clean.

MCAULEY MEDICAL, INC. • 78 REGIONAL DRIVE, SUITE 9 • CONCORD, NH 03301-8530

603.227.7287 • FAX: 603.227.7286 • 888.399.7287 • WWW.MCAULEYMEDICAL.COM

FOR DESIGN ONLY, NOT FOR CONSTRUCTION

For lighter duty transfer applications, McAuley Medical also offers this lower-price-point Blue Board.

Don't be misled by imitators - insist on these McAuley Blue Board features:
 Anti-Microbial • 2-Year Warranty • Anti-Static • MRI Safe • Flame Retardant • NO Weight Limit



	Blue Transfer Board	Premium Silver Rollbord
Lowest Coefficient of friction on the market	✓	✓
MRI Compatible	✓	✓
Manufactured by Samarit, with 28 years experience in Rollbord technology	✓	✓
Anti-Microbial cover	✓	✓
Anti-Static cover	✓	✓
Molded plastic handles		✓
3-year Warranty (2 yr, for Blue Board)		✓
Heavy duty use		✓
6 Models (4 Blue Board models)		✓

Handy Rollbord Accessories



Disposable cover sheet
 Inexpensive, disposable thin plastic cover protects Rollbord from soiling and provides an additional layer of infection control.

SAMARIT Transglide For Lateral Transfer

- Easy-glide surface
- Durable HDP Construction
- Can bridge gaps up to 5"
- Radiolucent and anti-static



Small - 470.1140
 Large - 470.1170

Rollbord Disposable Cover Dispenser and Hanger System

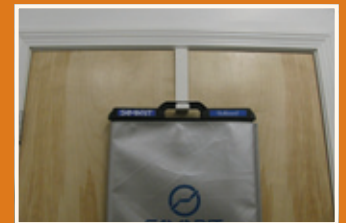
- FDA Approved Powder Coating • Steel construction • Can sit on a counter top (rubber feet included) • Easy to wipe clean



Rollbord Disposable Cover Dispenser
 Part # 440.1088



Rollbord Wall Mount Hanger
 Part # 440.1086



Rollbord Door Mount Hanger
 Part # 440.1087



ROLLBORD MODELS ARE DESIGNED TO FIT A VARIETY OF APPLICATIONS THROUGHOUT YOUR FACILITY.

Rollbord Model	Application(s)	Department(s)
A. Surgiboard 47" x 16" Part # 440.0400	To and from OR Table	Operating Room
B. Mini-Gyn 32" x 20" Part # 440.0300	To and from Bed, Stretcher and OR Table	Birthing Unit
C. Bariatric 70" x 20" Part # 440.0200	To and from Bariatric Bed and Stretcher (reinforced to carry more weight)	ED, ICU, Imaging, Inpatient Floor, LTC, Homecare
D. Standard 70" x 20" Part # 440.0100	To and from Bed, Stretcher and XRay Table	ED, ICU, Imaging, Birthing, Inpatient Floor, LTC, Homecare, Ultrasound, Morgue
E. MRI 70" x 16" Part # 440.0500	To and from MRI table, CT, Cath Lab, OR Table	MRI, CT, Cath Lab, IR, Nuclear Medicine, OR
F. Ambulance 60" x 16" Part # 440.0900	EMS Stretcher to Bed	Ambulance, ED



Also available:
Disposable
Cover Sheets

Long
Part # 440.1000
80" x 24"

Short
Part # 440.1400
57" x 20"





MCAULEY MEDICAL, INC.

Safe Patient Handling Solutions

FOR IMMEDIATE RELEASE

MEMIC, a leading New England Worker's Compensation insurance specialist, recently completed a rigorous scientific evaluation of Lateral Transfer Devices to find the best solutions for reducing friction and lowering push/pull forces, and review non-motorized friction reducing devices used for Lateral Transfer and Bed Repositioning. The study utilized the state-of-the-art Lumbar Motion Monitor developed at Ohio State University, as well as simple lower cost push/pull gauges that measure applied force.

The trials were performed by a team comprised of an ergonomists, hospital safety management consultant, RNs, and a safe patient handling engineer.

The evaluation measured peak pull force, patient comfort, and probability of caregiver low back injury. Here are the results of the study:

Lateral Transfer Devices that are not motorized

Non Motorized Device	Peak Pull Force Average of 4 trials	Patient Comfort Rating 1=best	Probability of Low Back Injury
Cotton Draw Sheet	<p>Highest Peak Pull Force</p> <p>Lowest Peak Pull Force</p>		<p>Highest Probability of Back Injury</p> <p>Lowest Probability of Back Injury</p>
Wooden Board			
White Plastic Board		4	
Blue Plastic Transglide Board		2	
Metal Roller Board		7	
Plastic Slide Sheet		6	
Two Piece Nylon Slide Sheet		5	
Tubular Nylon Slide Sheet		3	
Samarit Rollbord		1	

All of these devices cost less than \$1,000 each

Conclusion: The data showed a decrease in the probability for inclusion in a high risk group for lower back injury when using of a friction reducing device to perform a lateral patient transfer. The cause for this reduction is the fact that the employee can slide the patient using a friction reducing device rather than being required to lift the patient when using a traditional draw sheet.

* * * * *

For further information, please contact John McAuley, (603) 227-7287



OPERATION & CARE MANUAL

P-2010

P-2020

P-2030

P-2040

P-2055

120V



P-2010



P-2055

BLANKET WARMING CABINET OPERATION & CARE

PREPARATION

Before operating the cabinet, clean both the interior and exterior of the unit with a damp cloth and mild soap solution. Wipe with an appropriate disinfectant. Wipe dry with a clean cloth or air dry.


ELECTRICAL INFORMATION & CAPACITIES




The power specifications are located on the unit identification rating tag. This tag is permanently attached to the unit and must be located to verify power requirements.

P-2010 POWER REQUIREMENTS


120 V.A.C. — 50/60 Hz, 1 ph
 0.6 kW, 5.0 Amps
 Safety Class I Equipment
 No Applied Parts
 Mode of Operation: Continuous


 NEMA 5-15P
 15A - 125V Plug
 Hospital Grade

 **IP XO**

P-2040 POWER REQUIREMENTS


120 V.A.C. — 50/60 Hz, 1 ph
 1.92 kW, 16.0 Amps
 Safety Class I Equipment
 No Applied Parts
 Mode of Operation: Continuous


 NEMA 5-20P
 20A - 125V Plug
 Hospital Grade

 **IP XO**

P-2020 POWER REQUIREMENTS


120 V.A.C. — 50/60 Hz, 1 ph
 0.7 kW, 5.8 Amps
 Safety Class I Equipment
 No Applied Parts
 Mode of Operation: Continuous


 NEMA 5-15P
 15A - 125V Plug
 Hospital Grade

 **IP XO**

P-2055 POWER REQUIREMENTS


120 V.A.C. — 50/60 Hz, 1 ph
 1.8 kW, 15 Amps
 Safety Class I Equipment
 No Applied Parts
 Mode of Operation: Continuous


 NEMA 5-20P
 20A - 125V Plug
 Hospital Grade

 **IP XO**

P-2030 POWER REQUIREMENTS

120 V.A.C. — 50/60 Hz, 1 ph
 1.0 kW, 8.3 Amps
 Safety Class I Equipment
 No Applied Parts
 Mode of Operation: Continuous

 NEMA 5-15P
 15A - 125V Plug
 Hospital Grade

 **IP XO**

Wire diagram is located under top cover of unit.

Grounding reliability can only be achieved when equipment is connected to an equivalent receptacle marked "Hospital Grade."



Protective Earth
Ground Symbol

Medical Equipment classified by Underwriters Laboratories with Respect to Electrical Shock, Fire and Mechanical Hazards only, in Accordance with UL 60601-1 and CAN/CSA C22.2 No. 601.1.



UL File No.
E201645

DANGER



AT NO TIME SHOULD THE INTERIOR OR EXTERIOR BE STEAM CLEANED, HOSED DOWN, OR FLOODED WITH WATER OR LIQUID SOLUTION OF ANY KIND. DO NOT USE WATER JET TO CLEAN.



SEVERE DAMAGE OR ELECTRICAL HAZARD COULD RESULT.
WARRANTY BECOMES VOID IF APPLIANCE IS FLOODED



Hazardous
Voltage Present



DANGER



ENSURE POWER SOURCE MATCHES VOLTAGE IDENTIFIED ON APPLIANCE RATING TAG.

GENERAL INFORMATION

This warming cabinet is designed to elevate blanket temperatures to a level which will increase patient comfort.

The warming cabinet is constructed with stainless steel exterior casing and door with handle and hinges designed to withstand heavy usage. A door with window allows observation of inventory with the door closed. The cabinet is warmed using low-heat-density electrothermal cable array. The electrothermal cable is positioned in the floor and two sides of the warming cabinet, providing even heating of the interior chamber.

The temperature of each chamber is regulated by an electronic control consisting of a 4 digit L.E.D. display, ON/OFF button, INCREASE and DECREASE buttons, integrated control lock-out feature, timer and a series of prompt sequence indicators. The design and operational characteristics of the cabinet eliminate the need for a heat circulating fan.

The electronic control can easily be set to operate in Fahrenheit or Celsius. After a power failure, the cabinet will remember its programming and begin to operate as before. The ON/OFF indicator will blink to indicate a failure occurred; pressing the ON/OFF button once will eliminate this blinking. A thermal shut-off system, separate from the electronic control, is included as an additional safety feature.

The control will display temperature in whole degrees.

The design and operational characteristics of the chamber eliminate the need for a heat circulating fan.

The electronic control has an adjustable temperature range of 37° to 93°C (98° to 200°F).

The TIMER feature allows the user to program the control to automatically turn on and turn off once during a 24 hour period at selected times. This enables the chamber to be shut off automatically at night to save energy, but to turn on again in the early morning to ensure warm blankets are available.

P-2010 INFORMATION:

The cabinet is equipped with one (1) epoxy-coated blanket support assembly and is furnished with four (4) 1-1/4" (31mm) non-skid rubber feet.

P-2020 INFORMATION:

The cabinet is equipped with one (1) epoxy-coated blanket support assembly and one (1) center shelf. The cabinet is furnished with one (1) set of 5" (127mm) heavy duty casters, two with locking brake.

P-2030 INFORMATION:

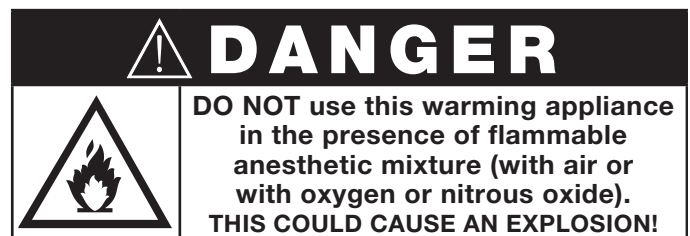
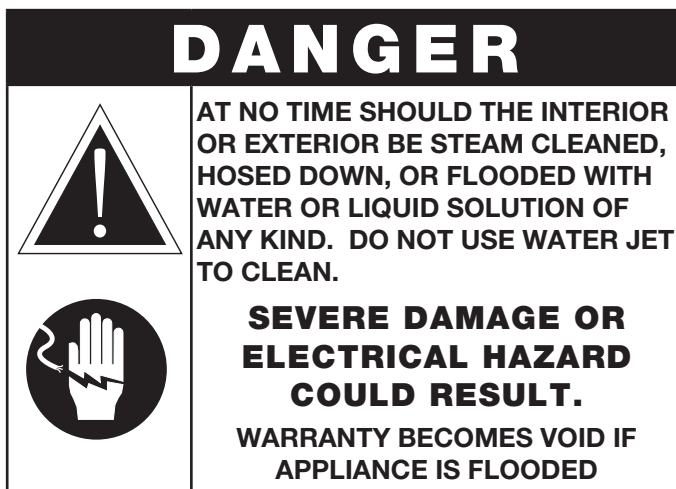
The cabinet is equipped with one (1) epoxy-coated blanket support assembly and one (1) center shelf. The cabinet is furnished with one (1) set of 5" (127mm) heavy duty casters, two with locking brake.

P-2040 INFORMATION:

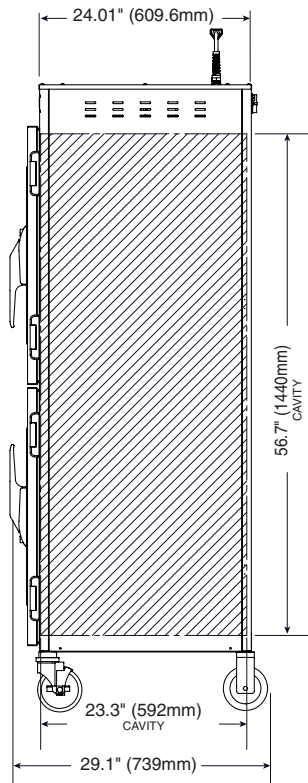
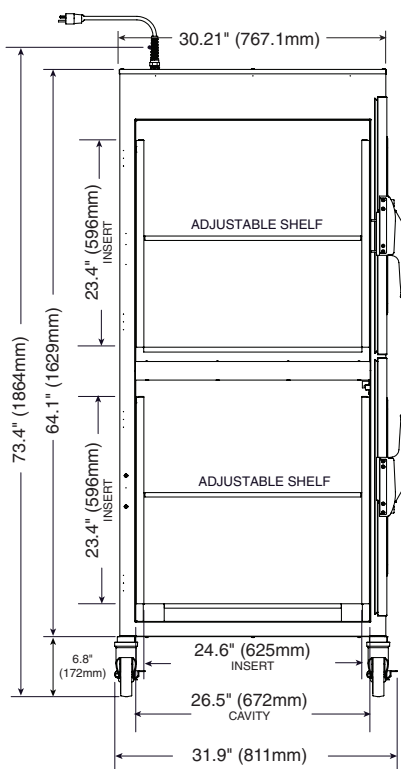
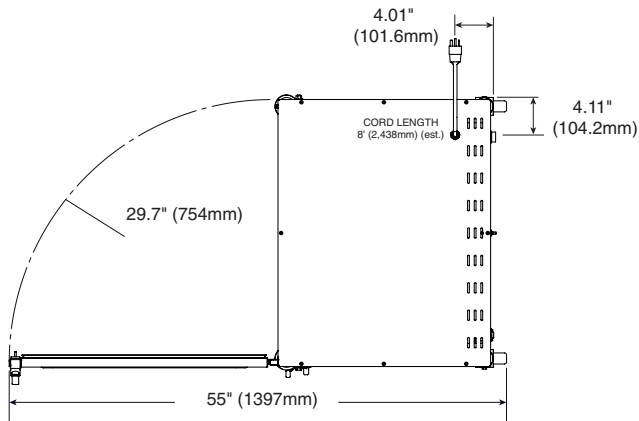
Each compartment is equipped with one (1) epoxy-coated blanket support assembly and one (1) center shelf. The cabinet is furnished with one (1) set of 5" (127mm) heavy duty casters, two with locking brake.

P-2055 INFORMATION:

The cabinet is equipped with one (1) epoxy-coated blanket support assembly and one (1) center shelf per door opening. The cabinet is furnished with one (1) set of 5" (127mm) heavy duty casters, two with locking brake.



P - 2055 DIMENSIONS



TRANSPORTATION DAMAGE AND CLAIMS



All Pedigo Products, Inc. equipment is sold F.O.B. shipping point, and when accepted by the carrier, such shipments become the property of the consignee.

Should damage occur in shipment, it is a matter between the carrier and the consignee. In such cases, the carrier is assumed to be responsible for the safe delivery of the merchandise, unless negligence can be established on the part of the shipper.

1. Make an immediate inspection while the equipment is still in the truck or immediately after it is moved to the receiving area. Do not wait until after the material is moved to a storage area.
2. Do not sign a delivery receipt or a freight bill until you have made a proper count and inspection of all merchandise received.
3. Note all damage to packages directly on the carrier's delivery receipt.
4. Make certain the driver signs this receipt. If he refuses to sign, make a notation of this refusal on the receipt.
5. If the driver refuses to allow inspection, write the following on the delivery receipt:

Driver refuses to allow inspection of containers for visible damage.

6. Telephone the carrier's office immediately upon finding damage, and request an inspection. Mail a written confirmation of the time, date, and the person called.
7. Save any packages and packing material for further inspection by the carrier.
8. Promptly file a written claim with the carrier and attach copies of all supporting paperwork.

We will continue our policy of assisting our customers in collecting claims which have been properly filed and actively pursued. We cannot, however, file any damage claims for you, assume the responsibility of any claims, or accept deductions in payment for such claims.

PEDIGO PRODUCTS, INC. LIMITED WARRANTY

Pedigo Products, Inc. warrants to the original purchaser that any original part that is found to be defective in material or workmanship will, at our option, subject to provisions hereinafter stated, be replaced with a new or rebuilt part.

The labor warranty remains in effect one (1) year from installation or fifteen (15) months from the shipping date, whichever occurs first.

The original parts warranty for the cavity fan motor remains in effect one (1) year from installation of appliance or fifteen (15) months from the shipping date, whichever occurs first. The original parts warranty on all other parts remains in effect three (3) years from installation of appliance or thirty-nine (39) months from the shipping date, whichever occurs first.

This warranty does not apply to:

1. Calibration
2. Equipment damage caused by accident, shipping, improper installation or alteration.
3. Equipment used under conditions of abuse, misuse, carelessness or abnormal conditions including equipment subjected to harsh or inappropriate chemicals including but not limited to compounds containing chloride or quaternary salts, poor water quality, or equipment with missing or altered serial numbers.
4. Any losses or damage resulting from malfunction, including loss of contents or consequential or incidental damages of any kind.
5. Equipment modified in any manner from original model, substitution of parts other than factory authorized parts, removal of any parts including legs, or addition of any parts.
6. Collateral or incidental damage as a direct result of servicing equipment built into a wall structure is not covered under warranty. It is the responsibility of the owner to bear all expense related to structural repairs including, but not limited to, external electrical connections and wiring, and the removal or replacement of caulk, grout, tile, or wall covering of any kind. A service access panel for built-in equipment installations is strongly recommended.

This warranty is exclusive and is in lieu of all other warranties, expressed or implied, including the implied warranties of merchantability and fitness for purpose. In no event shall the Company be liable for loss of use, loss of revenue, or loss of contents or revenue, or for indirect or consequential damages. This warranty is in lieu of all other warranties expressed or implied and Pedigo Products, Inc. neither assumes or authorizes any persons to assume for it any other obligation or liability in connection with Pedigo Products, Inc. equipment.

Pedigo Products, Inc.

Record the model and serial numbers of the unit for easy reference. Always refer to both model and serial numbers in your correspondence regarding the unit.

Model: _____
 Serial Number: _____
 Purchased From: _____
 Date Installed: _____ Voltage: _____

Warranty Effective November 1, 2012



Pedigo Products, Inc
 4000 S.E. Columbia Way • Vancouver, WA 98661 • U.S.A.
 Phone: 800.822.3501 • Fax: 360.696.1700 • www.pedigo-usa.com

AXIOM-15-3 (2U/1L Warmer)

18.9" x 21.4" x 8.5"
(48.0cm x 54.4cm x 21.6cm)



 Servers and airpots sold separately

- EQUIP# COF01
- Adjusts automatically to varying water pressure
 - For high lime areas, BrewLOGIC® technology calculates flow rate and adjusts brew time to maintain consistent pot levels
 - Cold brew lock-out and automatic warmer time-out ensure high quality, fresh tasting coffee
 - Front of machine programming simplifies installation
 - For high lime areas, BrewLOGIC® technology calculates flow rate and adjusts brew time to maintain consistent pot levels
 - Large 200oz. (5.9L) tank provides back-to-back brewing capacity
 - Coffee extraction controlled with pre-infusion and pulse brew, digital temperature control, and large sprayhead; coffee strength controlled with variable by-pass.
 - Energy-saver mode reduces tank temperature during idle periods
 - Ensures coffee brew quality with cold brew lock out capability
 - Hot water faucet
 - SplashGard® funnel deflects hot liquids away from the hand

Agency:



Specifications

Product #: 38700.0000

Warmers: Two Upper/ One Lower

Water Access: Plumbed

Finish: Stainless

Funnel: Black Plastic

Faucet: Upper

Additional Features

DBC

Electrical & Capacity

Volts	Amps	Watts	Cord Attached	Plug Type	8oz cups/hr 236ml cups/hr	Input H ₂ O Temp.	Phase	# Wires plus Ground	Hertz
120	15	1800	Yes	NEMA 5-15P	67	60°F (15.5°C)	1	2	60

Plumbing Requirements

PSI	kPa	Fitting Supplied	Water Flow Required (GPM)
20-90	138-621	1/4" Male Flare Fitting	-

CAD Drawings

2D	Revit	KLC
●		

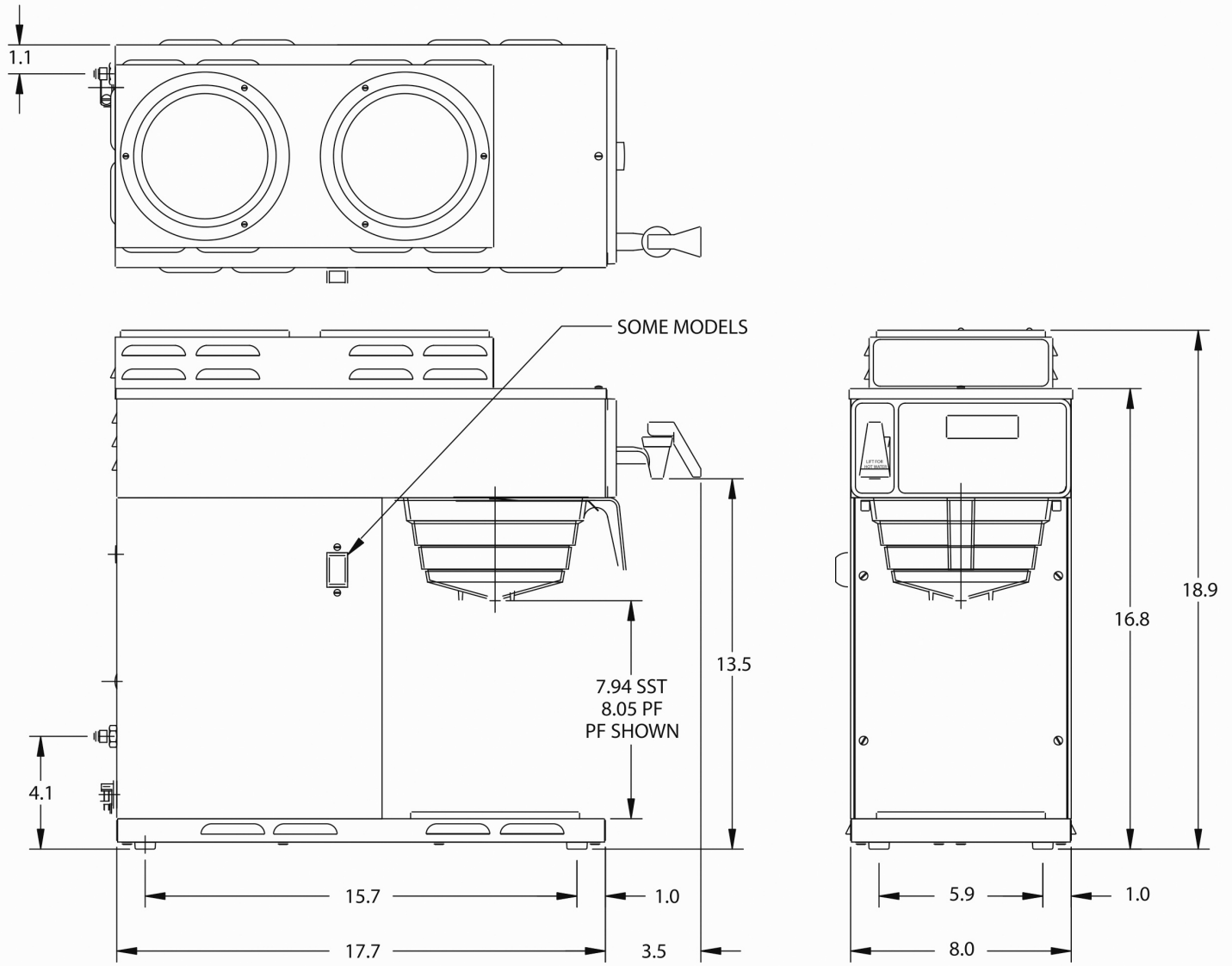


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Created on:
11/13/2015

For most current specifications and other info visit bunn.com

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	Unit			Shipping				
	Width	Height	Depth	Width	Height	Depth	Weight	Volume
English	8.5 in.	18.9 in.	21.4 in.	-	-	-	30.507 lbs	5.440 ft ³
Metric	21.6 cm	48.0 cm	54.4 cm	-	-	-	13.838 kgs	0.154 m ³



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Related Products & Accessories: AXIOM-15-3 (2U/1L Warmer)(38700.0000)



FILTERS,REGULAR1M
500/2 50/CL

Product #: 20115.0000



FUNNEL W/DECALS,
BLACK PLASTIC

Product #: 20583.0003



WATER FILTER
SYSTEM, EQ-17-TL

Product #: 30200.1000



WATER FILTER,IN LINE
ED-17-TL

Product #: 30201.1001



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Serving & Holding Options: AXIOM-15-3 (2U/1LWarmer)(38700.0000)



EASY POUR,(BLK) 1/CS
Product #:06100.0101



EASY POUR,(BLK) 2/CS
Product #:06100.0102



EASY POUR,(BLK) 3/CS
Product #:06100.0103



EASY POUR,(BLK) 6/CS
Product #:06100.0106



EASY POUR,(BLK) 12/CS
Product #:06100.0112



EASY POUR,(BLK) 24/CS
Product #:06100.0124



EASY POUR,(BLK) 6-1/2 CS
Product #:06100.0156



EASY POUR,(ORN) 1/CS
Product #:06101.0101



EASY POUR,(ORN) 2/CS
Product #:06101.0102



EASY POUR,(ORN) 3/CS
Product #:06101.0103



EASY POUR,(ORN) 6/CS
Product #:06101.0106



EASY POUR,(ORN) 12/CS
Product #:06101.0112



EASY POUR,(ORN) 24/CS
Product #:06101.0124



DECANTER, GLASS-BLK 12C 24/CS
Product #:42400.0024



DECANTER, GLASS-BLK 12CUP 1PK
Product #:42400.0101



DECANTER, GLASS-BLK 12C 3/CS
Product #:42400.0103



DECANTER, GLASS-ORN 12C 24/CS
Product #:42401.0024



DECANTER, GLASS-ORN 12 CUP 1PK
Product #:42401.0101



DECANTER, GLASS-ORN 12C 3/CS
Product #:42401.0103



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K-CUP®

Single Cup Brewing System

COMMERCIAL SERIES

K150

This feature-rich brewer is perfect for small to medium-sized environments

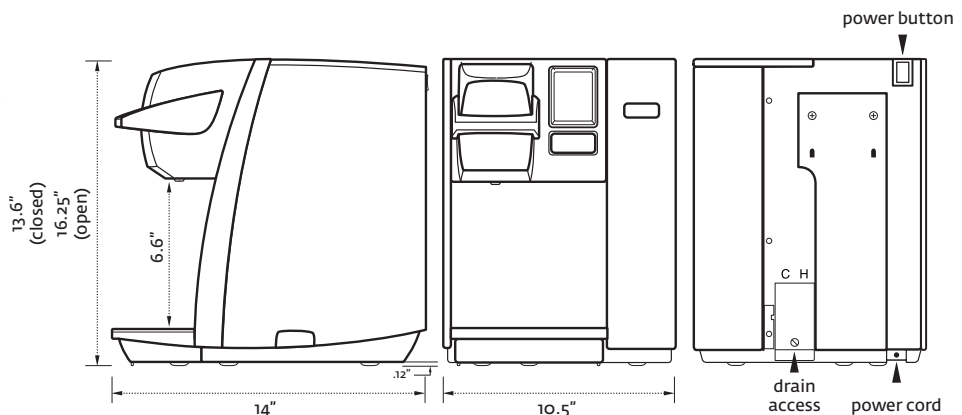
- Color Touchscreen Interface for easy operation
- Large 90 oz. Water Reservoir or direct line plumbed for continuous use
- Five programmable brew sizes to meet the needs of multiple users



Engineered for
Continuous Use

Reorder #97047MS Rev A
© 2013 Keurig, Incorporated.
www.keurig.com

Brew Sizes	4 oz., 6 oz., 8 oz., 10 oz., 12 oz.
Water Source	Pour Over or Plumbed (with Direct Plumb Kit Accessory)
Cold Water Tank	90 oz.
Drainable Internal Water Tank	Yes
Interface	LCD Full Color Touchscreen
– Multiple Languages	English/French/Spanish
– Programmable Clock	Yes
– Program "On/Off"	Yes
– Program "Auto Off"	Yes
– Customize Brew Temperature	Yes
– Customize Brew Size Options	Yes
– Program Contact Screen Info	Yes
Brewer Weight (Empty)	18 lbs
UL Listed	cULus Commercial & Household
NSF Certification	NSF/ANSI 4 Food Equipment
Electrical	120 VAC, 60 Hz, Single Phase, 15A
Power	1400W
Plug Type	2-Wire Plus Ground
Product Number	20150
UPC Number	649645201504



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ECO-PACK™

The Compact Compactors™



1800

3600

2400

For over 30 years, the Eco-Pack design has set the industry standard for performance and durability.

Saves Money and Improves Your Facility

- Haulers and landfills charge by volume, not weight. Eco-Pack condenses the same amount of trash into a smaller block. Only pay fees for the waste, not the air!
- Space saving design keeps the equipment close to the source, employees stay at their stations.
- High-density, plastic liners reduce spills, litter and odor.
- Eco-Pack makes your facility, workstation and public areas more attractive and healthier.
- Compacted waste discourages animals and other "dumpster divers".

Easy to Use

- Full-load signal alerts you when to empty contents.
- Lock on compaction chamber and controls protect employees and public.
- Small footprint frees up valuable floor space.
- Fits through most standard doorways for easy installation.
- Level surface with standard electric outlet is all that's required. No drain, special electrical, plumbing or area prep necessary.
- Heavy casters make moving an Eco-Pack easy.
- Larger models include built-in ejector strap to simplify trash cube removal.

Built to Last in Tough, Demanding Applications

- Stainless steel exterior.
- Heavy-duty, welded carbon steel frame with baked-on powder coat epoxy paint.
- Ribbed, heavy-section cast aluminum compaction plate.
- Industrial grade, electro-hydraulic power pack.

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Retail & Manufacturing



Food & Beverage Service



Hospitals & Health Care Facilities



Cruise Lines & Work Boats

EQUIP# COM01

SPECIFICATIONS AND FEATURES

MODEL	1800	2400	3600
Overall Dimensions			
Height (Top to Bottom)	48-5/8"	76-1/2"	90"
Width (Left to Right)	24"	28-3/4"	43"
Depth (Front to Back)	26"	29-1/4"	31"
Weight (Lbs)	526	669	1210
Loading Door			
Height	12-1/6"	18-1/2"	22-1/4"
Width	20-2/3"	24"	36"
Compaction Ratio (Max)			
	15:1	20:1	20:1
Compacted Waste Cube			
Height	17"	18"	17"
Width (Left to Right)	19-1/2"	23-3/4"	35"
Depth (Front to Back)	18"	24"	24"
Weight (Lbs)*	50-105	70-150	200-400
Compaction			
Force (Lbs)	7,854	12,272	20,739
Electrohydraulic Compaction in all Models			
Power			
Electrical (Standard) — 115 volt, 15 amp, dedicated 50/60 Hertz, 1 phase			
Electrical (Optional) — 230 volt, 7-1/2 amp, 50/60 Hertz, 1 phase			
Approvals			
Listed to US & Canadian Standards			
Approval to European Standards Available			
Options And Accessories			
<ul style="list-style-type: none"> • Germicidal lamp for odor and biological control. • HEPA (high efficiency particulate) filtration for particle control. • Activated charcoal filter to reduce unpleasant odors. • Pak-a-lift cart for transporting waste cube. • Two-piece, breakaway cube for ease of plastic liner removal. 			

*Approximate. Actual weight determined by composition.

Specifications subject to change without notice.



Large, stainless steel loading door.



Crushes cans, pails & drums with ease.



Easy to access and remove waste cube.



FOUNTAIN INDUSTRIES

922 East 14th Street, Albert Lea, MN 56007-3218

Toll-Free: 800-328-3594 Fax: 507-373-7404 Telephone: 507-373-2351

E-mail: custserv@fountainindustries.com • www.eco-pack.net

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Many WT Farley products have helped customers achieve Joint Commission Requirements



- Tilt bar
- 6" me
- Choo

CR-DC04E (chrome)
 CR-DC04E-R (red)
 CR-DC04E-G (green)
 CR-DC04E-Y (yellow)
 4 E cylinder capacity
 11" W x 11" D x 39" H, 21 lbs

CR-DC06E (chrome)
 CR-DC06E-R (red)
CR-DC06E-G (green)
 CR-DC06E-Y (yellow)
11" W x 16" D x 39" H, 21 lbs



CR-DC12E (chrome)
 CR-DC12E-R (red)
 CR-DC12E-G (green)
 CR-DC12E-Y (yellow)
 12 E cylinder capacity
 x 35 0 lbs

CR-DC20E (chrome)
 CR-DC20E-R (red)
 CR-DC20E-G (green)
 CR-DC20E-Y (yellow)
 20 E cylinder capacity
 21" W x 25" D x 39" H, 34 bs



Now Available in Color Code **Green** full, **Red** empty, **Yellow** mixed



CR-DC28E (chrome)
 CR-DC28E-R (red)
 CR-DC28E-G (green)
 CR-DC28E-Y (yellow)
 28 E cylinder capacity
 21" W x 35" D x 39" H, 31 lbs

GREEN Full Cylinders	RED Empty Cylinders	Yellow Opened Cylinders
CR-DC06E-G	CR-DC06E-R	CR-DC06E-Y

Stack-&-Rack



*Need help?...
 ...Call today
 for assistance!*





CABINET, MEAL TRAY DELIVERY

Lakeside Manufacturing Model No. SP-6373

Elite Series™ Tray Delivery Cart, 6 tray capacity, ledge spacing 6", max. tray size 15" x 20", min. tray size 14" x 18", s/s exterior, welded 1" tubular push handle (moved from top), removable door, 6" casters (4 swivel) NSF

MAGNET Addition of a magnet to hold door open 270 degrees.

Please note: Push handle to be on back (19-1/2" side to the left of the door) rather than on top - required to fit in dumb waiter.

Please note: Two casters closest to the handle to be swivel with no locks, the other two casters to be fixed.

DIMENSIONS: 33X22X46



G.S.M.

G.S.M. 32 Bushel Fixed Shelf Cart

Ideal for exchange, top up or bulk delivery, our fixed shelf carts are built to last. Although weighing in at only 100LB (approx), an all welded construction, integrating the shelves and structural members, give this cart exceptional strength. Shelves are reinforced along their entire length, and slope 5 degrees to the back, to help secure load and facilitate cart wash.

Standard Specifications and Features

Body Structure

All welded 1 1/4" x 11 ga. extruded square tube corner posts with 3/4" x 14 ga. round tube vertical closure (back and ends) and structural channel horizontal members. Top is open. Vertical closure tubes pass through horizontal members and are welded at each contact point inside the structural channel. All structural profiles are extruded aluminum with rounded corners.

Shelf Structure

Base shelf plus two fixed shelves of 16 ga. aluminum sheet with mill applied white baked enamel finish. Shelves are supported by a flange of horizontal extrusion on all four sides of the cart, and one lengthways 1 1/4" square tube center support. Shelves are sloped 5% to back of cart. (except base)

Finish

Carts are anodized to a film thickness of 8 to 10 microns after completion of fabrication and all welding procedures. (conforms to military spec. 4-8625 type 2 class 1)

Casters

Casters are top quality 6" diameter, non marking neoprene, with 325lb ea. rated capacity, 2 fixed and two swivel, with fixed casters mounted on LHE of cart. Casters are spaced 17 3/4" center to center.

Bumpers

6 non marking corner bumpers.

Part Number: GSM-G160

Size: Outside: 61.5"L x 23.5"W x 70"H
Inside: 57.5"L x 20.75"W

Weight: 125 lbs.

Ships From:

[Get Freight Quote](#)

Armstrong Medical INDUSTRIES, INC.

- Side shelf
- Plastic top
- Push handles (2)
- Accessory panels (2)
- Locking casters (2)
- Swivel caster
- Tracking caster
- Breakaway locking bar (length of bar is equal to Cart size)
- Stabilizing frame with bumper
- Durable aluminum mounting tracks
- TENTE Casters
- Carts require some assembly



Premier Aluminum Beige 5-Drawer, Breakaway Lock, 24in.

Product No: PBL-B-24

- Overall: 39.55"H x 25.02"D x 34.05"W (includes bumper, handles, and casters)
- Drawer size: 17 1/16"D x 22 1/4"W
- Drawer heights: 3"H (3), 6"H, 9"H



Item # _____

Job _____

LIFELINE™ EMERGENCY CART

Designed for a code. Not adapted for one.

Lifeline's redesigned, integrated features are specifically designed for Code Response.

- **Infection Control:** Lifeline helps improve Infection Control with a cleaner design that includes corrosion proof polymer materials, smooth rounded corners to allow for easy cleaning and Microban Antimicrobial Product Protection that keeps the cart cleaner between cleanings.
- **Superior Maneuverability:** Lightweight polymer construction, 5" (127mm) diameter casters, an ergonomic handle and a proprietary 5th wheel steering system provides for easy maneuvering and assures maximum control in transit.
- **Organization and Identification:** Get organized with Lifeline. Self-closing, full access drawers in a variety of heights, drawer divider systems, exchange trays and drawer labels are available to allow for easy access and identification of drawer contents.
- **Security for Every Need:** Tamper evident seals secure the top compartment, drawers and side bins. Drawers can be sealed in segments or one seal can secure the entire cart.
- **Field Upgradeable:** Drawers and many accessories may be added or reconfigured at the facility. Choose the drawers and accessories for today's Code Response needs and change them to meet tomorrow's.



METRO
Lifeline™
Emergency Cart



Metro incorporates several elements in its product design to support a facility's infection control processes:

- Microban® antimicrobial protection helps keep products "cleaner between cleanings"
- Polymer and other proprietary finishes provide corrosion resistance
- Smooth rounded corners to allow for easier cleaning

Look for the "red check" symbol for this added protection



*Microban® antimicrobial product protection helps keep shelves "cleaner between cleanings" by inhibiting the growth of bacteria, mold and mildew that cause odors and stains on the shelf surface.

*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



InterMetro Industries Corporation
North Washington Street
Wilkes-Barre, PA 18705
www.metro.com



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35.01

LIFELINE™ EMERGENCY CART



Code Response Cart LECCRP2



Code Response Cart LECCRP3



Code Response Cart LECCRP4



Code Response Cart LECCRP5



Code Response Cart LECCRP7



Code Response Cart LECPEDS2

Upgradeability.



Basic Cart with side bins and tank holder



Upgrade with defibrillator arm, storage bin and suction shelf



Upgrade again with drawers, trays & dividers

One of the best features about Lifeline is its upgradeability. Start with a basic model based budget or current requirements and buy the confidence that it can change as your needs change.

LIFELINE™ EMERGENCY CART

Code Response Preconfigured Carts

Carts shown on the previous pages are configured with the components and accessories listed here.

Accessories

Model No.	Description	Cat. No.								
		LECCRP2	LECCRP3	LECCRP4	LECCRP5	LECCRP6	LECCRP7	LECCRP8	LECPEDS1	LECPEDS2
LEC143	Top Cavity Tray		X		X	X		X		
FL151	3" (76mm) Drawer Divider Tray with Dividers				1	2				7
FL159	6" (152mm) Drawer Divider Tray with Dividers				1	1				1
FL190	Label Holder Set of 10						X			
FL211	Side Bin (1) — Locking		3	3	3		4	3	2	4
FL221	Waste Basket 28 Quart & Holder	X				X			X	
LEC236	Glove Box Holder — Single (mounts to handle side)				X				X	
LEC251	Lockable Sharps Container (mounts to handle side)	X			X	X				X
FL302	Cord Manager				X		X			X
LEC304	Adjustable Defibrillator Tray	X	X	X	X	X	X	X	X	X
FL305	Hospital Grade 6-Outlet Strip and Holder						X			X
LEC306	Suction Pump Shelf		X		X		X	X		X
LEC308	Backboard with Front Assembly Kit		X	X	X	X		X	X	
LEC309	Backboard with Back Assembly Kit	X					X			X
	Included Oxygen Tank Holder	X	X	X	X	X	X	X	X	X
FL315	I.V. Pole with Cart Mount	X	X	X	X	X	X	X	X	X
LEC319	Storage/Gel Bin		X				X	X		
LEC320	Plastic Security Seals 100 pack	X	X	X	X	X	X	X	X	X
FL403	Individual Drawer Seal Lock Bar									X
LEC-PED8	Pediatric Code Response Drawer Kit								X	X

Carts

Model No.	Description	LECCRP2	LECCRP3	LECCRP4	LECCRP5	LECCRP6	LECCRP7	LECCRP8	LECPEDS1	LECPEDS2
LEC24P	39" (991mm) Cart	X	X					X		
LEC27P	42" (1067mm) Cart			X	X					
LEC30P	45" (1143mm) Cart					X	X		X	X

Drawers with Code Blue* Drawer Pull

Model No.	Description	LECCRP2	LECCRP3	LECCRP4	LECCRP5	LECCRP6	LECCRP7	LECCRP8	LECPEDS1	LECPEDS2
LEC103	3" (76mm) Drawer	1	2	2	3	4	2	2	7	7
LEC106	6" (152mm) Drawer	3	1	1	1	1	2	1	1	1
LEC109	9" (203mm) Drawer		1		1	1	1			
LEC112	12" (305mm) Drawer			1						

*Multicolor Drawer Pulls are provided on Pediatric Carts



5th wheel
maneuverability.

Lightweight polymer construction, ergonomic handle and proprietary 5th-wheel steering system assures maximum control in transit and maneuverability during a code.

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LIFELINE™ EMERGENCY CART

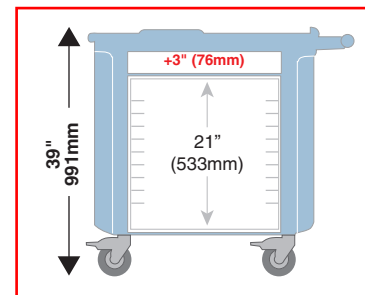
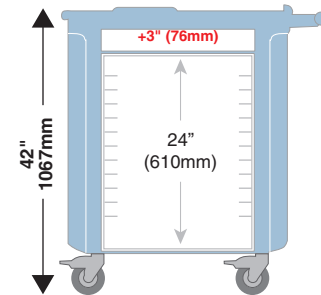
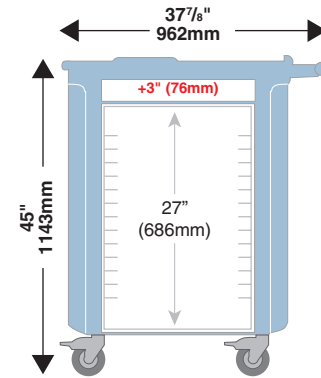
Specifications:

- **Cart Body:** Blow molded high density polyethylene (HDPE) body panels and top with Microban antimicrobial product protection. Top has integrated push handle and storage compartment. Side panels provide integrated accessory strips to allow no tool assembly of most accessories. Left side panel also provides integrated pivot pockets for tilt out bins. Bins are available as locking or non-locking.
- **Cart Frame:** Epoxy coated 14 gauge, cold rolled steel
- **Locking Mechanism:** 12 gauge stainless steel bar with polycarbonate drawer mounted lock tabs. Passive security provided for drawers and side bins (optional) with plastic security seal. Locking mechanism provides one or two seal compartmentalized locking options.
- **Steering Mechanism:** Steering is assisted by a 5th wheel that is actuated by squeezing a polymer trigger mounted to the cart handle. When activated, the 5th wheel is locked perpendicular to the handle providing positive control when cart is pushed. When trigger is released all 5 wheels swivel allowing maneuverability in any direction. **5th Wheel:** 4" (102mm) diameter plate caster, mounted to a swivel lock mechanism. Patent Pending.
- **Corner Casters:** Four 5" (127mm) diameter stem casters with polyurethane tread and ABS horn: 2 Swivel — Rear, 2 total lock (brake and swivel lock) — Front
- **Drawers:** ABS injection molded drawer body, blow molded HDPE with Microban antimicrobial drawer front, ABS and Microban antimicrobial injection molded colored drawer pull and full extension, self-closing, ball bearing drawer slides.

Inside Dimension: 17" x 20" (432 x 511mm)

Weight Capacity	Inside Height
3" (76mm) = 15 lbs. (6.75kg)	2.75" (70mm)
6" (152mm) = 25 lbs. (11.25kg)	5.75" (146mm)
9" (228mm) = 45 lbs. (20.25kg)	8.75" (222mm)
12" (305mm) = 45 lbs. (20.25kg)	11.75" (298mm)

- **Pullout shelf:** 1.75" (44mm) high epoxy coated 16 gauge cold rolled steel, with full extension, self-closing, ball bearing drawer slides. Weight Capacity: 45 lbs. (20.25kg)
- **Defibrillator Swing Arm:** 18 gauge tubular steel, epoxy coated with tensioning knob. Swings 90 degrees from work surface,
- **Adjustable Defibrillator Platform:** Two 16 gauge epoxy coated steel plates with zinc adjustment mechanism and 360 degree rotation. 14.5" (368 mm) wide platform adjust from 8" (203mm) to 14.125" (359 mm) in length. Weight capacity: 40 lbs. (18kg)



External Dimensions (D x L x H):
 23 1/8" x 37 7/8" x 44 7/8" (587 x 962 x 1140mm)
 23 1/8" x 37 7/8" x 41 1/2" (587 x 962 x 1054mm)
 23 1/8" x 37 7/8" x 38 1/8" (587 x 962 x 968mm)

OVERALL DIMENSIONS WITH ACCESSORIES: 44x24x52

All Metro Catalog Sheets are available on our Web Site: www.metro.com



InterMetro Industries Corporation
 North Washington Street, Wilkes-Barre, PA 18705
 Phone: 570-825-2741
 Fax: 570-825-2852

L02-175

Printed in U.S.A. 2/09

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For Product Information: U.S. and Canada: 1.800.433.2332 Latin America: 1.561.333.3824 Asia/Pacific: +65.6567.8003 Middle East/Africa: +971.4.811.8286

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Item # _____

Job _____

SUPER ERECTA SHELF® UTILITY CARTS — SP SERIES — HEAVY DUTY

Literally hundreds of different utility carts can be assembled from basic Super Erecta Shelf components — wire shelves, casters, and one-piece handles. Finishes exist for basic dry environments and for corrosive, wet environments. Customize each cart with accessories to address the application.

- **Convenient Selection:**

- 2-shelf and 3-shelf models
- 5 popular size configurations
- 3 material finishes

- **Three finishes and caster types**

Type 304 stainless steel models are ideal for corrosive, wet environments and include 5" (127mm) polyurethane casters with polymer caster horns and stainless axles.

Chrome-plated models are suitable for a variety of dry environments and include 5" (127mm) polyurethane casters with plated caster horns.

Super Erecta Brite plated models are an economic option for dry environments and include basic 5" (127mm) resilient rubber casters with plated caster horns.

- **Heavy-Duty, Highly Maneuverable:** These carts can handle and distribute a large volume of material safely and efficiently.
- **Super Erecta Shelf® Construction** makes units easy to assemble with positive placement, and makes relocation of shelves quick and simple.
- **Wire Shelves:** Bright, modern sanitary appearance, open construction minimizes dust accumulation, maximizes visibility and air circulation.
- **Donut Bumpers** are included with casters.
- **One-Piece Handles**
- **Height:** 39" (991mm) from the floor to the top of the handle when using 5" (127mm) casters.
- **Accessories** can customize the cart for many applications. See catalog sheets 10.04 and 10.05.



*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



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SUPER ERECTA SHELF®
Utility Carts — SP Series — Heavy Duty

12.10



**SUPER ERECTA SHELF®
UTILITY CARTS — SP Series**

Standard Units

SP Series carts can be ordered by a single catalog number. Two- and three-tier models are available. Carts consist of two or three wire shelves with plastic split sleeves, two one-piece handles, donut bumpers and designated casters.

Super Erecta Brite finish — 600 lb. (273kg) capacity per cart

- 5M Resilient Rubber Casters; casters have plated horns and axles.

Shelf Width/Length (in./mm)		Approx. Pkd. Wt. (lbs./kg)		2-TIER MODELS Model No. Super Erecta Brite	Approx. Pkd. Wt. (lbs./kg)		3-TIER MODELS Model No. Super Erecta Brite
18x36	457x914	40	18	2SPN33ABR	50	22.5	3SPN33ABR
21x36	530x914	44	20	2SPN43ABR	55	24.7	3SPN43ABR
24x36	610x914	48	22	2SPN53ABR	61	27.4	3SPN53ABR
24x48	610x1219	54	24	2SPN55ABR	70	31.5	3SPN55ABR
24x60	610x1524	64	29	2SPN56ABR	85	38.2	3SPN56ABR

Chrome finish — 900 lb. (408kg) capacity per cart

- 5M Polyurethane Casters; casters have plated horns and axles.

Shelf Width/Length (in./mm)		Approx. Pkd. Wt. (lbs./kg)		2-TIER MODELS Model No. Chrome	Approx. Pkd. Wt. (lbs./kg)		3-TIER MODELS Model No. Chrome
18x36	457x914	40	18	2SPN33DC	50	22.5	3SPN33DC
21x36	530x914	44	20	2SPN43DC	55	24.7	3SPN43DC
24x36	610x914	48	22	2SPN53DC	61	27.4	3SPN53DC
24x48	610x1219	54	24	2SPN55DC	70	31.5	3SPN55DC
24x60	610x1524	64	29	2SPN56DC	85	38.2	3SPN56DC

Type 304 Stainless Steel — 900 lb. (408kg) capacity per cart

- 5PC Polyurethane Casters; casters have polymer horns and stainless steel axles.

Shelf Width/Length (in./mm)		Approx. Pkd. Wt. (lbs./kg)		2-TIER MODELS Model No. Stainless Steel	Approx. Pkd. Wt. (lbs./kg)		3-TIER MODELS Model No. Stainless Steel
18x36	457x914	40	18	2SPN33PS	50	22.5	3SPN33PS
21x36	530x914	44	20	2SPN43PS	55	24.7	3SPN43PS
24x36	610x914	48	22	2SPN53PS	61	27.4	3SPN53PS
24x48	610x1219	54	24	2SPN55PS	70	31.5	3SPN55PS
24x60	610x1524	64	29	2SPN56PS	85	38.2	3SPN56PS

Note: 5PC casters are not appropriate for use in cart wash or autoclave applications.

One-Piece Handles

Build-a-cart to your exact specifications using Super Erecta wire or solid shelves, Super Adjustable wire shelves and stem casters.

Shelf Width (in./mm)	Approx. Pkd. Wt. (lbs./kg)	Model No. Chrome	Model No. Stainless Steel
18 457	5.5 2.5	H3C	H3S
21 530	5.8 2.6	H4C	H4S
24 610	6 2.7	H5C	H5S



All Metro Catalog Sheets are available on our Web Site: www.metro.com



InterMetro Industries Corporation

North Washington Street, Wilkes-Barre, PA 18705
Phone: 570-825-2741
Fax: 570-825-2852

L02-056
Printed in U.S.A. Rev. 1/10

Information and specifications are subject to change without notice. Please confirm at time of order.

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For Product Information: U.S. and Canada: 1.800.433.2332 Latin America: 1.561.333.3824 Asia/Pacific: +65.6567.8003 Europe: +31.76.597.7550 Middle East/Africa: +971.4.811.8286

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EZtote390 Material Handling Tote Stocking Cart



Our material handling, utility and stocking carts have been specifically designed to maximize employee efficiency and safety while minimizing the amount of floor space required to store them when not in use. These innovative solutions have been manufactured with durability and quality in mind and make excellent additions to your back room equipment arsenal.

Length 30.39"
Width 20.51"
Height 41.15"
Weight 44 lbs



G.S.M.

G.S.M. 32 Bushel Fixed Shelf Cart

Ideal for exchange, top up or bulk delivery, our fixed shelf carts are built to last. Although weighing in at only 100LB (approx), an all welded construction, integrating the shelves and structural members, give this cart exceptional strength. Shelves are reinforced along their entire length, and slope 5 degrees to the back, to help secure load and facilitate cart wash.

Standard Specifications and Features

Body Structure

All welded 1 1/4" x 11 ga. extruded square tube corner posts with 3/4" x 14 ga. round tube vertical closure (back and ends) and structural channel horizontal members. Top is open. Vertical closure tubes pass through horizontal members and are welded at each contact point inside the structural channel. All structural profiles are extruded aluminum with rounded corners.

Shelf Structure

Base shelf plus two fixed shelves of 16 ga. aluminum sheet with mill applied white baked enamel finish. Shelves are supported by a flange of horizontal extrusion on all four sides of the cart, and one lengthways 1 1/4" square tube center support. Shelves are sloped 5% to back of cart. (except base)

Finish

Carts are anodized to a film thickness of 8 to 10 microns after completion of fabrication and all welding procedures. (conforms to military spec. 4-8625 type 2 class 1)

Casters

Casters are top quality 6" diameter, non marking neoprene, with 325lb ea. rated capacity, 2 fixed and two swivel, with fixed casters mounted on LHE of cart. Casters are spaced 17 3/4" center to center.

Bumpers

6 non marking corner bumpers.

Part Number: GSM-G160

Size: Outside: 61.5"L x 23.5"W x 70"H
Inside: 57.5"L x 20.75"W

Weight: 125 lbs.

Ships From:

[Get Freight Quote](#)

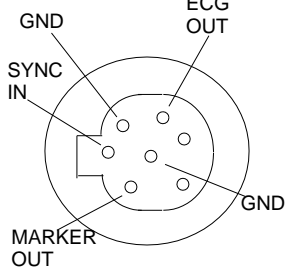
ZOLL®

R Series® ALS Operator's Guide



Defibrillator Specifications

General	
Size (height • width • length)	8.2 in. • 10.5 in. • 12.5 in. with handle or 10.0 in. without handle 20.8 cm • 26.7 cm • 31.7 cm with handle or 25.4 cm without handle
Weight	13.6 lb (6.17 kg) with OneStep cable and battery pack 15.2 lb (6.89 kg) with paddles
Power (for R Series ALS, BLS and Plus models)	Battery: Rechargeable lithium ion battery pack AC Power Requirements: 100-120 Vrms, 50/60 Hz 220-240 Vrms, 50 Hz AC Power Consumption: 275 VA maximum
Device classification	Class I and internally powered per EN 60601-1.
Design standards	Meets or exceeds applicable requirements of UL 60601, AAMI DF80, IEC 60601-2-4, EN 60601-2-25, and EN 60601-2-27.
Patient safety	All patient connections are electrically isolated.
Environmental	
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage and shipping temperature	-20°C to 60°C (-4°F to 140°F)
Humidity	5% to 95% relative humidity, noncondensing
Vibration	IEC 68-2-6 and IEC 68-2-34
Shock	IEC 68-2-27, 50 g 6mS half sine
Operating pressure	594 to 1060 millibars (-1253 to 14046 ft.)
Particle and water ingress	IEC 529, IP 22
Electromagnetic compatibility (EMC)	CISPR 11 Class B - radiated and conducted emissions
Electromagnetic immunity	AAMI DF80; EN 61000-4-3 to 10 V/m
Electrostatic discharge	AAMI DF80; EN 61000-4-2
Conducted susceptibility	EN 61000-4-4, 61000-4-5, 61000-4-6
Display	
Screen type	High-resolution, liquid crystal display (LCD)
Screen size	6.5 inches (16.5 cm) diagonally
Display format	Nonfade moving bar display.
Sweep speed	25 mm/s
Viewing time	5 seconds 4 seconds with certain monitoring parameter options

Printing method	High-resolution, thermal array print head	
Printout modes	Manual or automatic; user-configurable	
Data card		
Type	Compact flash card	
Sync in / Marker out / ECG out		
Sync In	0-5 V (TTL Level) pulse, active high, 5 to 15 msec in duration, no closer than 200 ms apart. Energy transfer begins within 25 ms of the leading edge of the external sync pulse.	<p>R Series Connector Pinout</p>  <p>AMP/TYCO P/N 1445718-1 Mating Connector: AMP/TYCO 1445322-1</p>
Marker Out	0-5 V (TTL Level) pulse, active high, 10 ms in duration, the leading edge of the pulse occurs within 35 ms of the peak of the R-wave)	
ECG Out	1.0 V/cm of deflection on stripchart recorder <25 ms delay from patient ECG input	
Wi-Fi Card		
ZOLL R Series Data COMM	Model: 802.11 abgn Wireless LAN Compact Flash Card	

Battery Pack Specifications

Type	Rechargeable lithium ion
Weight	1.7 lb (0.77 kg)
Nominal voltage	10.6 V
Recharge time	4 hours or less within R Series.
Operating time	<p>For a new, fully charged battery at 20°C:</p> <ul style="list-style-type: none"> • 100 defibrillator discharges at maximum energy (200 joules), or • 4 hours of continuous ECG monitoring, or • 3.5 hours of continuous ECG monitoring and pacing at 60 mA, 80 pulses per minute
Low battery indicator	<p>The message <i>LOW BATTERY</i> is displayed on the screen when there is approximately 15 minutes of ECG monitoring time left on the battery. Two-beep low battery tone sounds once a minute until just before shutdown when the unit beeps twice every 2 seconds.</p> <p>The time from display of the message <i>LOW BATTERY</i> or <i>REPLACE BATTERY</i> until the defibrillator shuts down varies depending on the battery age and condition.</p>
Battery Shelf Life	3 months before retest and recharge

VASCULAR DOPPLEX[®]



Handheld Dopplers and PPG systems
for vascular assessment and intraoperative use

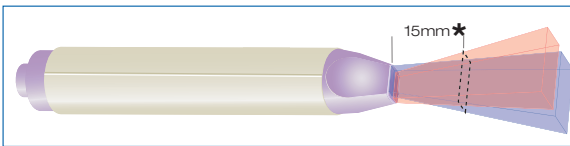
VASCULAR DOPPLEX®

Based on over 20 years experience in this field, the latest generation of the world renowned Dopplex® handheld Doppler range offers even greater performance, quality and value.

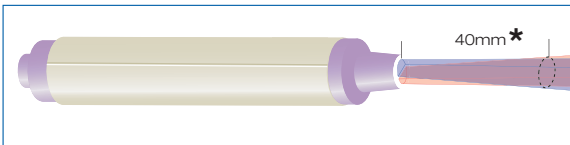
Improvements include:

- New probe design with 50% greater sensitivity
- New EZ8 wide beam probe for easy vessel detection
- Increased audio performance
- Efficient battery management
- New three year warranty
- Optional accessories include a new battery charger kit and Doppler stand

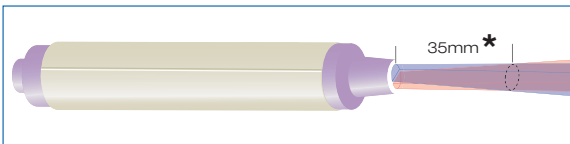
WIDE BEAM
TECHNOLOGY



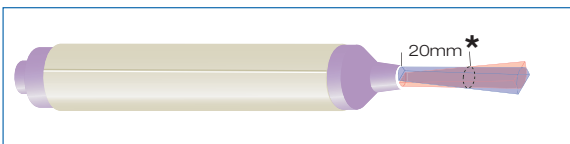
EZ8 Probe: The new 8MHz High Sensitivity EZ8 Doppler probe incorporates Wide Beam technology to allow easy location of the vessel and maintenance of vessel contact during blood pressure cuff inflation and deflation.



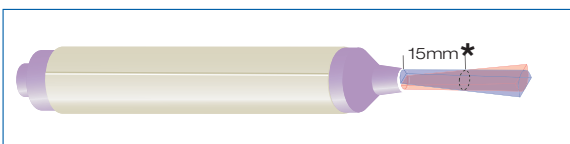
VP4HS: A 4MHz High Sensitivity Doppler probe for detection of deep lying vessels.



VP5HS: A 5MHz High Sensitivity Doppler probe for edematous limbs and deep lying vessels. The ideal probe as an adjunct to the EZ8 for ABI measurements.



VP8HS: An 8MHz High Sensitivity Doppler probe for easier detection of peripheral vessels.



VP10HS: A 10MHz High Sensitivity Doppler probe for detecting smaller vessels in superficial applications.



IOP8: The new High Sensitivity Intraoperative, re-sterilizable probe. Ideal for vascular, reconstructive and cosmetic surgery applications.

* Approximate distances of peak sensitivity

ABI Assessment

It is recommended that the use of probes VP5HS and the EZ8 probe for peripheral edematous limbs are to be assessed for Ankle Brachial Index (ABI) testing.

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EQUIP# DOP01

Mini Dopplex® Non-directional Doppler

The Mini Dopplex® pocket audio Doppler with standard features. When combined with the EZ8 probe, it is ideal for vascular assessments and ABI measurements.

Order Code: MUL-D900-P-USA



Audio Doppler

Super Dopplex® II Bi-directional Doppler

The Super Dopplex® II Doppler is a bi-directional unit which displays flow direction. It is ideal for clinical specialists wishing to conduct advanced Doppler studies.

Order Code: MUL-SD2-P-USA



Bi-directional Doppler

Dopplex® Printa II package

Dopplex® Printa II package is a portable, AC/battery thermal printer, for use with the Multi Dopplex® II or Rheo Dopplex® II units, providing documentation of bi-directional waveforms and PPG curves for reimbursement and waveform documentation.

Order Code: MUL-PRINTA2/ACC76



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EQUIP# DOP01

Intraoperative Probe

The new bi-directional Intraoperative probe is used to confirm blood flow prior to closing, saving time and the cost of a potential re-operation.

The High Sensitivity probes are available in packs of 3 and can be re-sterilized by Autoclave or ETO.

A special electronic adaptor that resists diathermy interference allows connection to any Vascular Dopplex® Advanced Doppler.

The specially designed clamp attaches the Doppler to an IV pole.

A starter pack includes adaptor, pole clamp and 3 probes.

Order Code: MUL-ISP3

The probe pack contains 3 probes.

Order Code: MUL-IPP3

A starter pack with the MDII. Includes all components of the Starter Pack along with the Multi Dopplex II, High Sensitivity Doppler.

Order Code: MUL-ISP3-MD2



Accessories

Doppler Stand

A convenient way of securing your handheld Doppler and preventing it from disappearing into other departments. Height-adjustable secure mount on mobile five-wheel base.

Includes basket for storing gel, probes, cuffs, etc.

Order Code: MUL-DP100



Doplock for Handheld Dopplers

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Technical Information

PRODUCT FEATURES

	MINI DOPPLEX® DOPPLER	SUPER DOPPLEX® II DOPPLER	MULTI DOPPLEX® II DOPPLER	RHEO DOPPLEX® II DOPPLER
Product Order Code	D900	SD2	MD2	RD2
PPG capability				•
Range of eight probe options with probe coding	•	•	•	•
Built in loudspeaker and output for headphones	•	•	•	•
True separated stereo audio output		•	•	•
Separated bi-directional waveform outputs			•	•
Enhanced bi-directional LCD display		•	•	•
Waveform calibration function	3 level		5 level	5 level
Gain control			•	•
Auto shut off † and active noise reduction	•	•	•	•
Obstetric capability (audio only)	•	•	•*	•
RS232 digital interface			•	•
Interface to DOPPLEX® Printa™ II Package			•	•
Interface to DOPPLEX® Reporter™ Package			•	•
Battery Life**	500	250	250	250
Accessories	All models supplied complete with: stereo headphones, gel, soft carry pouch, battery and user manual			
Safety standards compliance	All models comply with EN60601-1:1990, IEC 60601 - 1:1988, EN60601-1-2:1993			
Weight	All models (including battery and one probe); 295gms (10oz)			
Dimensions	All models (main unit): Height 140mm (5.5") Width 74mm (2.9") Depth 27 (1.1")			
Battery Type	All models-9 volt alkaline-6LR61, 6LF22 or equivalent recommended (e.g. MN1604)			

For obstetric applications refer to the obstetric brochure available from your supplier

The Mini, Super, Fetal and Multi DOPPLEX II Dopplers are supplied with one probe of your choice as standard-please specify with order - additional probes are available separately from your supplier

* The Multi DOPPLEX II also calculates and prints FHR

** These are typical figures based on the number of one minute examinations-will vary depending on use and battery type.

† Refer to user manual

References

1. Tan Y, Da Silva AF, Digital photoplethysmography in the diagnosis of suspected lower limb DVT. Euro Journ of Vasc and Endovasc Surg. 1999 18:1. p71-79
2. McEnroe. CS, O'Donnell ThF, Mackey WC. Correlation of clinical findings with venous hemodynamics in 386 patients with chronic venous insufficiency. AmJ. Surg 1985; 156:148-52
3. Neumann H.A.M., Boersma IDS. Light Reflection Rheography - A non-invasive Diagnostic Tool for Screening for Venous Disease. J. Dermatol Surg Oncol. 1992; 18: 425-430
4. Hennings S, Jaeger H, Giffler M, Mathias K.D. Digital photoplethysmography as screening for acute DVT. European Congress of Radiology, 2000.
5. Tovey C, Haughton J.B, Yates D.W, Sammy I.A, Driscoll P.A, Chisholm R, Goodhall O. The diagnosis and management of Deep Vein Thrombosis (DVT), Nice conference 2000.
6. Williams G, Sen A, Watson D.K, patient investigation and management of patients with suspected lower limb DVT, a description and audit of the service developed by Wrexham Maelor hospital 9th Int. Conf on Emerg Med, Edinburgh 2002.

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40 Christopher Way
 Eatontown, NJ 07724-3327
T: (888) 223-1218 (732) 578-9898 **F:** (732) 578-9889
W: www.huntleigh-healthcare.com

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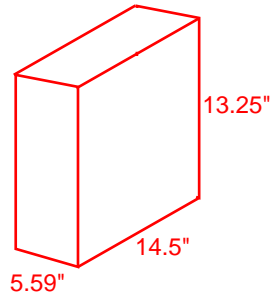
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GENLIT 015/01 LIT 618/02 (USA)

CABINET, BRACKET OR BASE OPTIONS



Locking Wall Cabinet

Code # OC-02-2004, OC-03-2004, OC-04-2004

The locking wall cabinet allows a 2, 3 or 4 gallon container to be completely enclosed and secure. As an added safety feature, the key can not be removed unless the cabinet door is locked.



Locking Wall Mount

Code # 0203WMA

The locking wall bracket mounts to any vertical surface and accommodates the 2 or 3 gallon container.



4 Gallon Locking Wire Wall Bracket

Code # WB-04

An alternative offering to the Locking Wall Cabinet, the 4 gallon locking wire wall bracket is constructed of durable powder coated steel and can be utilized for areas with limited or obstructed wall space.



Countertop Stability Base

Code # 0203SB

To free up valuable wall space, our durable resin countertop stability base affixes a 2 or 3 gallon container to any flat, stable surface. The base can be attached to the surface with semi-permanent adhesive

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2 Gallon Covidien RCRA Container

sku# 8602RC-P

OVERALL DIMENSIONS WITH BRACKET

12" W

10" D

12" H

Features & Benefits

- For use with [8963 \(/covidien-locking-wall-bracket/8963/\)](#) and [8975 \(/covidien-non-locking-wall-bracket/8975/\)](#).
- Safe, secure hinged lid accepts large items.
- Leak-resistant gasket and absorbent pad help contain liquid contents.
- PGII Rated to meet Department of Transportation (DOT) requirement for transport without secondary packaging.



Covidien Locking Wall Bracket

sku# 8963

For use with 2 gallon Covidien Sharps container. Easy to mount and ensures that sharps container is securely fastened to the wall. Ideal for patient/exam room containers. Sharps container not included. Lock and key included. This product is available as single brackets or as cases of 5 brackets.

Dimensions: 7.25"x11.25"x8"

Brand: Covidien

Count: 1 Bracket

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Centurion Medical Products EMED200/EMEBAG



Eme-Bag Dispenser

Eme-Bag Dispenser holds 1 sleeve of 24 Eme-Bags

Dimensions: 7x7x7

CED 500
EQUIP# DSP02



Counter Electric Dispenser

The CED 500 is designed using the highest quality materials and proven technology providing our customers with consistent drink quality.

CED 500 Counter Electric Dispenser

- > Stainless steel exterior, water bath, product lines, and drip tray assembly
- > Occupies a small area of counter space, only 10 ³/₈" wide
Compare with conventional dispenser
- > Available with 4 post-mix dispensing valves
- > All valves can be serviced independently
- > Insulation is CFC-free, 0 GWP, structural foam
- > Removable refrigeration deck, all installation from front of unit
- > CFC-free, R134A refrigerant
- > 1/4 hp compressor, 17 lb ice bank, high capacity flooded manifold
- > **Dispensing Solutions that *Pour More***



LANCER

lancercorp.com

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CED 500 EQUIP# DSP02

SPECIFICATIONS

DIMENSIONS

Height: 27.5" [699 mm]
Width: 10.375" [264 mm]
Depth: 25.25" [641 mm]

SPACE REQUIRED

Height: 33.5" [851 mm]
Width: 12.38" [315 mm]
Depth: 31.25" [794 mm]

ELECTRICAL

115V/60Hz, 7 AMPs
230V/50Hz, 3.3 AMPs

WEIGHT

Empty: 89 lbs [40.4 kg]
Operating: 131 lbs [59 kg]
Shipping: 108 lbs [49 kg]

ICE

Capacity: 17 lbs [7.7 kg]

FITTINGS

Soda Inlets: 3/8" male barb
Syrup Inlets: 3/8" male barb

VALVES

LEV® and other valves available upon request

COMPRESSOR

1/4 hp

MOTORS

Agitator: 15 w
Condenser fan: 9 w

ICE BANK CONTROL

Lancer Electronic Ice Bank Control

TRANSFORMER

24 V Secondary

WATER

Capacity: 5 gal

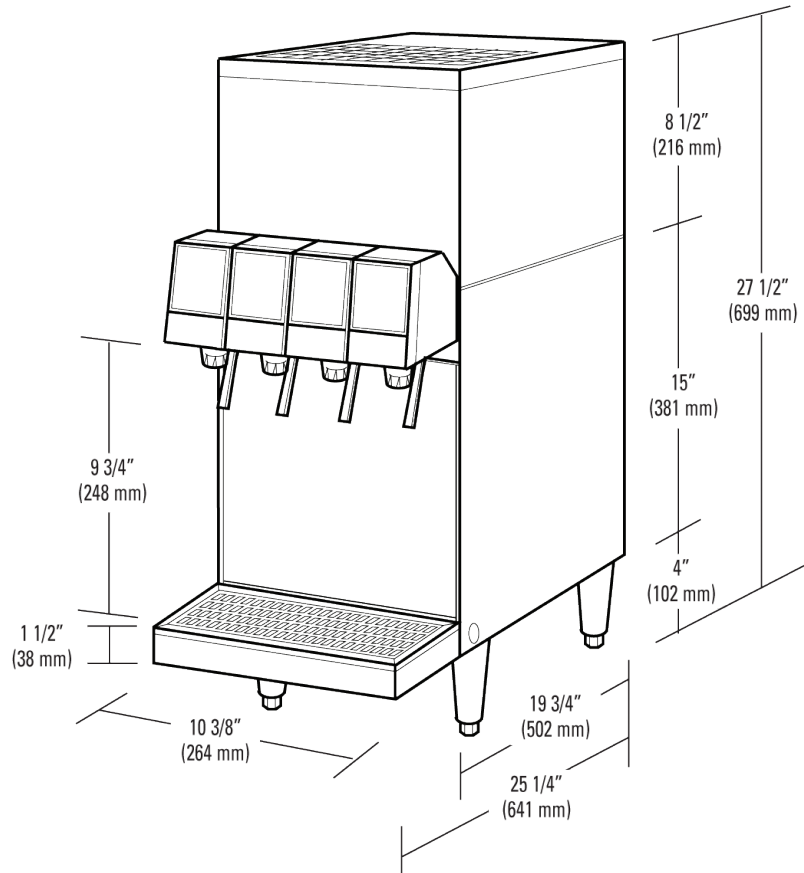
KEY LOCK SWITCH

DRAW PERFORMANCE

Number of Drinks Below 40°F [4.5°C]

75°F [24°C] Ambient Temperature

161 drinks; 12 oz/2 drinks per minute



OPTIONS



LIGHTED MARQUEE

Customer Service:

Should you require more information about our products, please do not hesitate to contact our customer service desk at custserv@lancercorp.com.

Warranty:

For warranty specifics by product, contact your Lancer Sales Representative. Equipment design and/or specifications are subject to change without notice.

Lancer Corp. 6655 Lancer Boulevard · San Antonio, TX 78219

210-310-7000 · 1-800-729-1500 · Fax: 210-310-7250

Pour More

LANCER

lancercorp.com



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**DIMENSIONS:
9X6X9 INCHES**

**Surgical Face Mask Dispensers
DISPENSER, FOR SURGICAL MASKS W/TIES**

- Designed for surgical face mask boxes
- Dispenser holds face masks with ties

Packaging	12 Each / Case
Manuf / Supplier	Medline
Manuf / Supplier #	NONFM122

SKU NONFM122

Specifications

Specifications	Values
Dispenser Type	Masks
HPIS Code	770_30_40_0
Latex Free	Yes
Product Type	Dispenser
UNSPSC	42131606
Unit Compatibility	Surgical Masks

Unit of Measure	Conversion	Net / Gross Weight (lbs)	Volume (cubic ft)	Dimensions (inch) L x W x H	GTIN
Each (EA)	1.0 Each	0.0 / 1.02	0.204	8.25 x 5.25 x 8.15	10884389961896 / 884389961899
Case (CS)	12.0 Each	0.0 / 12.55	2.406	12.3 x 12.9 x 26.2	40884389961897 / 884389961899



The Right Touch

PageWriter TC70 is designed for high volume hospital use – where the going is rough but quality is critical. A high-resolution 15-inch touch screen clearly displays 10 seconds of all 16 leads, color-coded for signal quality. Preview the full report – waveform and interpretation – before printing to save time and paper. Wireless communication simplifies life, allowing you to quickly download orders and send data to your ECG management system.

Clinicians

Simple 1-2-3 process
3-in-1 Trident lead wires minimize

tangling

Mark cardiac events within 20 minutes of patient's ECG
Anatomic PIM design supports correct lead placement

Department Managers

Automated sequence speeds workflow
Critical Values identify patients who need urgent attention
LeadCheck reveals lead reversals at the bedside

IT Administrators

Strong wireless security toolset 802.11(i), WPA2
Connectivity using industry standards
Built on a native XML format

Cardiologists

Integrated interpretation on 16 leads
Advanced STEMI diagnostic tools
Previous ECGs aid clinical diagnosis

Technical Specifications

User Interface

Touch Screen	1-2-3 operation Context-sensitive application 5-wire, resistive touchscreen
Keyboard	65 button, standard full alphanumeric keyboard Special characters supported
Display	15 inch TFT

Signal Processing

Patient Interface Module	Remote, microprocessor-controlled digital module provides 5 μ V resolution
--------------------------	--

Pre-Processing Filters

AC Noise	50 to 60 Hz
Signal Processing	Artifact Rejection and Baseline Wander

Presentation Filters - 10 sec Reports

High Pass	0.05, 0.15, and 0.5 Hz
Low Pass	40, 100, and 150 Hz

Presentation Filters - Rhythm

High Pass	0, 05 and 0.15 Hz
Low Pass	40, 100, and 150 Hz

Electrical

Battery Capacity	Typically 50 ECGs on a single charge
Battery Recharge	5 hours to full capacity
AC power	100-240 VAC, 50/60 Hz
Power Consumption	75 W max

Mechanical

Dimensions	40 x 33 x 16 cm (15.7 x 13 x 6.3 in)
Weight	13 kg (28.7 lb)

KENDALL**IN-ROOM*****Sharps Disposal System****MOUNTING / INSTALLATION INSTRUCTIONS****INSTRUCTIONS DE MONTAGE • INSTRUCCIONES DE MONTAJE • INSTRUÇÕES DE MONTAGEM**

- For IN-ROOM* SHARPS Disposal System #85301H, 851608, 851609, 8556H, 85521H, 8516U, **85161H**, 85165H, 85301HN, 8559, 85401H

DIMENSIONS: 13X6X12"**See reverse side for additional installation instructions.**

Voir au verso des instructions supplémentaires sur l'installation.

Instrucciones adicionales de instalación en el reverso.

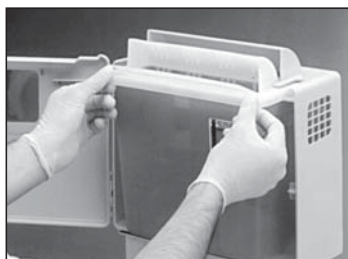
Ver o verso para as instruções de instalação adicionais.

Wear the necessary safety equipment when installing sharps disposal systems.

Porter les équipements de sécurité adéquats lors de l'installation des systèmes d'élimination des objets tranchants.

Cuando instale sistemas de desecho de objetos punzantes lleve el equipamiento de seguridad necesario.

Use o equipamento de segurança necessário quando instalar sistemas de eliminação de dispositivos cortantes.



- **Be sure to have the installer place disposable containers in wall brackets and inside wall enclosures as they are being installed.**

- Veiller à ce que l'installateur place les conteneurs jetables dans un support mural à l'intérieur d'un boîtier mural lors de l'installation.

- Asegúrese de que el técnico encargado de la instalación coloque los contenedores desechables en repisas y dentro de receptáculos de pared.

- Assegure-se que a pessoa que faz a instalação coloca os recipientes de descartáveis nos suportes da parede e dentro de recintos da parede à medida que estão a ser instalados.

- **Standardize the location of sharps containers as much as possible.** Locate sharps containers as close as possible to the area of use, keeping them out of the way of carts, beds and patient care objects. Special use areas such as Pediatrics, elderly/confused patient areas or high general public traffic areas raise additional safety issues. Individual hospital policies should be reviewed when choosing locations for sharps disposal containers.

Sharps containers must be placed at a height that permits the user to clearly see the top of the container so that inadvertent contact with the contents of the container can be avoided and the level of the container contents can be safely determined.

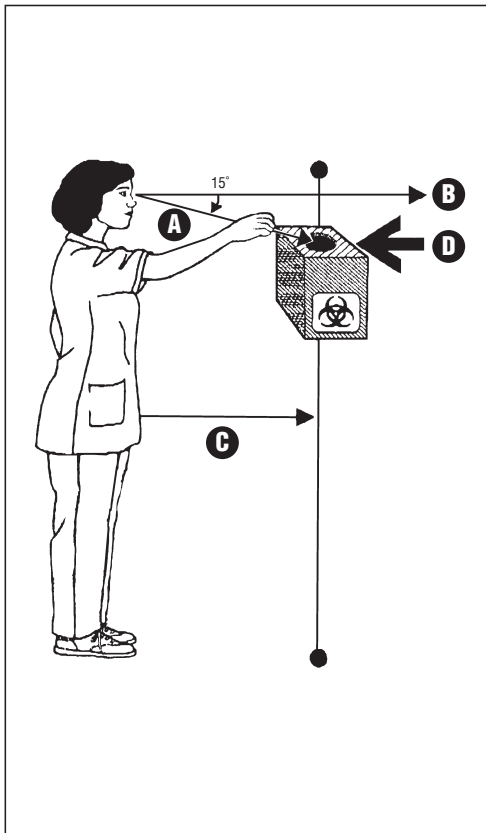
In all events, the user must be able to visualize the line of disposal.

Please be aware that the results of unintended contact with infectious contents of sharps containers include injury or transmission of serious and potentially life threatening disease.

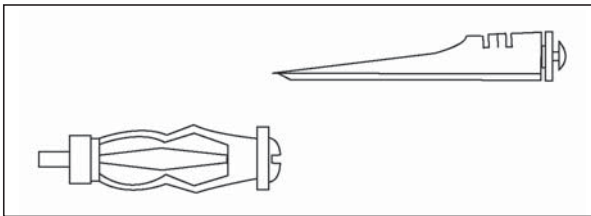
Don't place anything on top of the wall enclosure or sharps disposal container.

Example: Glove boxes, tissue boxes or used syringes.

• **ERGONOMIC INSTALLATION HEIGHT FOR A WALL-MOUNTED WORK STATION**



- A. Line of Sight
 - B. Eye Level = 57 inches (145 cm)
 - C. Thumb tip reach - 11 - 19 inches (28 - 48 cm)
 - D. **An ideal standing installation height for a fixed sharps disposal container is 52 - 56 inches (132 - 142 cm). This height will comfortably accommodate 95% of all adult female workers.**
- Illustration from: DHHS (NIOSH) Publication No. 97-111, "Selecting, Evaluating, and Using Sharps Disposal Containers."



■ **NEW INSTALLATION:**

- Select the appropriate fasteners for the type of mounting surface chosen (plaster, wall board, etc.). A minimum of four fasteners is recommended.
- Place the cabinet at a height that will allow the user to visualize the top of the container. Please refer to previous page for guidelines.
- Use mounting slots to secure cabinet to a stable vertical surface.
- Make sure cabinet is level, secure and flush with the surface on which it is mounted.

■ **EXISTING INSTALLATION:**

- This cabinet can also be mounted using existing holes by removing existing bracket or cabinet and aligning the new cabinet with the holes and refastening to mounting surface.
- Additional slots on wall enclosure may be used to adjust height without drilling new holes.
- Follow guidelines above ("New Installation").

CLINTON INDUSTRIES
G-1030 GLOVE BOX HOLDER

EQUIP# GLV02

•



- Dimensions: 17.75" W x 8.25" H x 3.75" D
- Powder coated steel wire construction
- Open design allows for easy glove identification
- Mounting hardware included
- Universal size fits most glove boxes

Soiled Linen Collection System and Recycling Program



Simplifies linen handling and helps reduce costs
FOR DESIGN ONLY, NOT FOR CONSTRUCTION

comprehensive programs

Tri-State's Soiled Linen Collection System and Plastic Liner Recycling Program are cost-saving, worry free systems that help save time and money in both hospitals and laundries alike.

easy, safe linen collection

maintenance free hampers

- We'll repair or replace any damaged hampers for you any time... no extra work on your part!
- Comply with JCAHO standards
- Bags are conveniently stored in Wallaby™ pouch right on the back of the hamper
- Hands-free lid opens easily with a foot pedal and shuts on its own to seal in odors
- Bags lock easily into place with no slipping
- Open-frame design helps reduce heavy lifting
- Lids can be custom labeled to match bag printing
- Available in several different sizes and styles



impervious bags

- Designed to hold manageable loads
- Meet OSHA regulations
- No need to reuse old, leaking cloth bags
- Strong enough to sustain rough handling – won't burst open when dropped down chutes
- Choose from a variety of sizes, styles and colors, stock or custom printing
- Premium drawtape bags also available





fast, efficient laundry sorting

a simple process

- Liners tear open easily with no lifting overhead
- Sorting can be done very quickly
- May allow for smaller labor force

money-saving recycling service

closed loop system

- We pick up the bales for you, eliminating waste hauling costs*
- Old bags are melted down, extruded as new bags and delivered back to the hospital
- Helps reduce medical waste



features and advantages

Clearly printed lids help reduce sorting mix-ups

Hampers are completely maintenance free! We repair or replace them for you... whenever you need it!

DIMENSION: (WXDXH) 19x20x33

Bags can be recycled* – we pick up old bags and deliver new ones back

Convenient bag storage

Easy tear bags make soil sorting quick and easy



Bags are tough and impervious

Open frame design helps eliminate injuries

Foot pedal creates hands free access

Hampers available in several sizes

* some restrictions may apply



The National Company with the Regional Name™
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Soiled Linen Cart/Hamper > Specification Sheet

- Height: 25 ¾"
- Width: 18 ½"
- Depth: 19 ½"
- Rugged, heavy-duty 1" diameter tubular 16 gauge steel frame with baked-enamel gloss finish (white powder coated)
- Sturdy steel step-on pedal opens the lid when stepped on; lid automatically closes when released – completely hands free
- Durable/sturdy lightweight poly-propylene copolymer lid seals the cart to contain odors
- "SOILED LINEN" is hot stamped on the lid
- 3/8" diameter coated solid steel friction bar holds the bag in place
- Pouch (Wallaby™) holds replacement bags made with flame retardant PVC, antimicrobial agents, and laminated to a polyester scrim.
- Sturdy tubular bottom platform supports heavy bag loads
- Fully open sides and front allows for ease of bag removal
- Sturdy, solid polymer non-marking swivel casters
- 4 individual locking casters



CENTURION MEDICAL PRODUCTS

100 CENTURION WAY | P.O. BOX 510 | WILLIAMSTON | MICHIGAN | 48895
 USA | 517.546.5400 | 800.248.4058 | www.centurionmp.com

IS305aLv1Soiled Linen Cart CX502 spec 1007-10
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Symphony Plus™ ice and water dispenser

12 CI series countertop with Chewblet® ice machine



Shown with SensorSAFE™

SensorSAFE infrared dispense



SensorSAFE not recommended for use with clear containers or for applications in direct sunlight

Features

Narrow, 16.12" (40.9 cm) width

12 lb (5.4 kg) ice storage capacity

Integral air-cooled ice machine with up to 425 lb (193.0 kg) daily production of popular Chewblet ice

- soft, chewable, compressed nugget ice is preferred over cubes¹ and is ideal for patient care
- Quiet Night™ sleep mode turns off ice machine when idle

Designed with sanitation in mind

- automatic self-flushing of ice machine removes impurities
- drain cup provides internal air gap for added protection of food zone components from drain line contaminants
- Agion® silver-based antimicrobial provides protection of key ice and water contact components²
- one-hand lever or SensorSAFE infrared ice dispense

Dependable design, easy to service and clean

- cleaning and sanitizing of entire machine takes only 1 hour
- LED display control board provides at-a-glance machine status
- panels are easily removed for accessibility to all components
- ice machine parts are common across all Symphony Plus dispensers
- stainless steel evaporator and auger deliver long life

Environmentally responsible

- meets Consortium for Energy Efficiency Tier 2 specifications
- R404a refrigerant has zero ozone depletion potential
- ice-only dispensers are ENERGY STAR® certified³
- continuous ice making process uses less electricity and water

Durable, attractive dispenser

- frame and exterior cabinet are stainless steel with accent trim
- poly drain pan, grille and dispenser lid are corrosion-resistant

Easy installation and industry's best warranty

- comes fully assembled and installs with three easy connections – electric, water and drain
- warranty – 3 years parts and labor, 5 years compressor parts

Accessories

Base stand with or without factory installed filter (refer to form# 7010)

4.00" (10.16 cm) leg kit (item# AF10LBLEGS)

Pressurized water sanitizing kits (refer to form# 6830)

SafeCLEAN™ environmentally responsible ice machine cleaner (item# 00132001)

Nu-Calgon IMS-III sanitizer, 16 oz bottle (item# 00979674)

Water filters (refer to form# 6380, 9905, 6070)

Additional Symphony Plus accessories (refer to price list)

Ice and water dispensers, 115V/60 Hz			
Ice storage capacity	Dispense	Ice machine cooling	Item number
12 lb (5.4 kg)	Lever	air	12CI425A-L
	SensorSAFE	air	12CI425A-S

Ice-only available, add -I
Example: 12CI425A-LI

Ice production		
Temperatures air/water	70/50 F (21/10 C)	90/70 F (32/21 C)
Air-cooled	425 lb (193.0 kg)	325 lb (147.6 kg)
Energy consumption per 100 lb (45.4 kg) ice	N/A	6.0 kWh air-cooled
Water consumption	12.0 gal (45.4 L) of potable water per 100 lb (45.4 kg) of ice	

Job

Item

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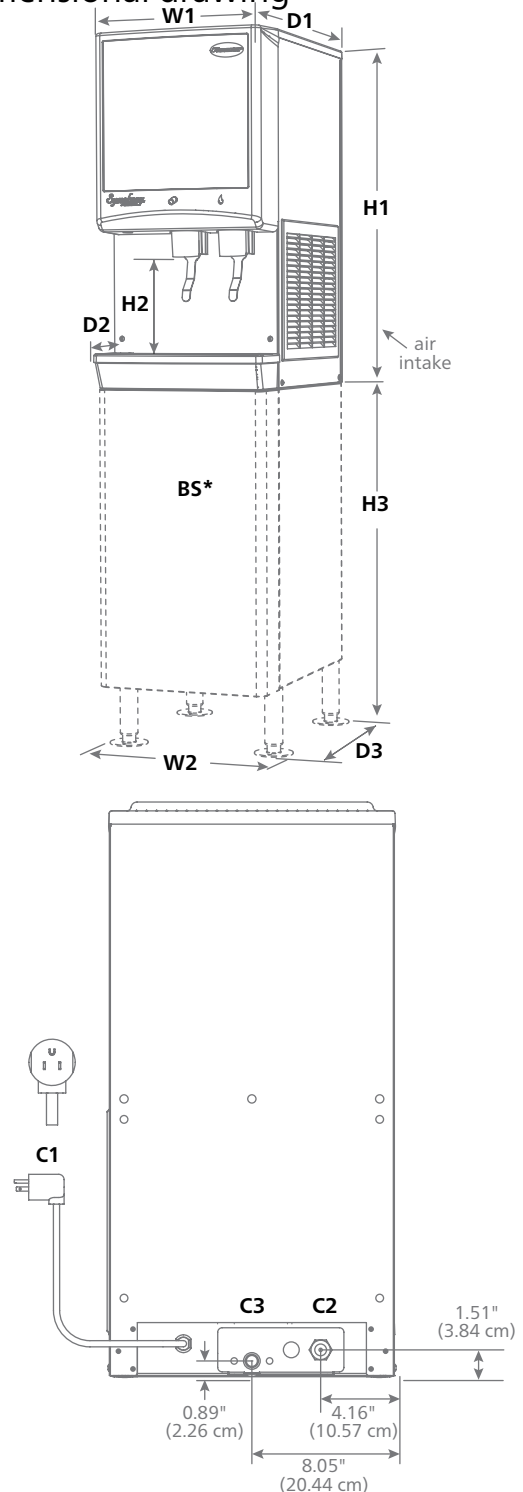
Specification

Ice storage capacity	12 lb (5.4 kg)
W1 Width	16.12" (40.9 cm)
W2 Width, base stand accessory	17.5" (44.4 cm)
D1 Depth, dispenser	23.50" (59.7 cm)
D2 Depth, drain pan	5.50" (13.97 cm)
D3 Depth, base stand accessory	22.00" (55.9 cm)
H1 Height, dispenser	32.50" (82.6 cm)
H2 Dispense height clearance	9.38" (23.83 cm)
H3 Height, base stand accessory	33.00" (83.8 cm)
Ventilation clearance	6.00" (15.24 cm) top and right side
Service clearance	12.00" (30.5 cm) top
Utility connection location	through back or bottom
C1 115 V/60/1 electrical	11 amps, 0.8 kW 8.5' (2.6 m) cord w/ NEMA 5-15 90° hospital-grade plug
C2 Potable water inlet	3/8" FPT
C3 Drain	3/4" MPT
Air temperature	50 - 100 F (10 - 38 C)
Water temperature	45 - 90 F (7 - 32 C)
Water pressure	10 - 70 psi (69 - 483 kpa)
Heat rejection	5000 BTU/hr
Approximate ship weight	199 lb (90.3 kg)
Approximate ship weight, base stand accessory	80 lb (36.3 kg)

NOTE: For indoor use only

SHORT FORM SPECIFICATION: (Choose one) ___ Ice and water or ___ ice-only dispenser to be Follett® automatic load in countertop configuration, with 12 lb (5.4 kg) of storage and separate ice and water chutes. Dispenser cabinet to be of stainless steel. Environmentally responsible R404a air-cooled ice machine to have 24 hour production capacity of approximately 425 lb (193.0 kg) of Chewblet compressed nugget ice at water temp. of 70 F (21 C); air temp. of 50 F (10 C). Ice machine equipped with automatic self-flushing and Quiet Night sleep mode. Dispenser to have automatic bin level control to start and stop ice machine. Storage area insulated with non-CFC, high density, foamed-in-place polyurethane. 8.5' (2.6 m) cord and NEMA 5-15 90° hospital grade plug provided. NSF and ETL listed.

Dimensional drawing



BS* – Base stand sold separately; measurements shown are with base stand legs at lowest position

Note: See dispenser detail sheet, form# 6675, for counter cutouts.

- 1 Independent third party studies. Contact Follett for details.
- 2 Disclaimer: Antimicrobial protection is limited to the treated components and does not treat water or ice.
- 3 ENERGY STAR certification applies only to ice-only dispensers. While the Symphony Plus ice and water dispensers have the same efficient ice makers and refrigeration systems with the same ice machine electrical and water consumption as their complementary ice-only models, there is no ENERGY STAR category for ice and water dispensers at this time.

Agion is a registered trademark of Sciessent LLC.

ENERGY STAR and the ENERGY STAR mark are registered trademarks owned by the U.S. Environmental Protection Agency.

Symphony Plus, SensorSAFE, SafeCLEAN and Quiet Night are trademarks of Follett Corporation.

Chewblet and Follett are registered trademarks of Follett Corporation, registered in the US.

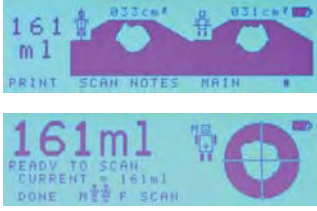
Follett reserves the right to change specifications at any time without obligation. Certifications may vary depending on country of origin.

12 CI series countertop

BladderScan[®] BVI 3000

Bladder Volume Instrument

How BladderScan Works



The BladderScan calculates bladder volume using patented V_{MODE}[®] technology. V_{MODE} ultrasound is easy to use and comfortable for the patient. When you press the scan button, within seconds, the V_{MODE} technology measures ultrasonic reflections on multiple planes inside the body and produces a 3-dimensional image. Based on this image, the BladderScan calculates and displays the bladder volume.

Volume measurements made with V_{MODE} ultrasound are more accurate than those from conventional 2-dimensional ultrasound, as they are based on a more complex, 3-D image of the bladder.



By implementing the BladderScan BVI 3000, you can improve the quality of care for patients with urinary problems.

DIAGNOSE

- Measure post-void residual (PVR)
- Differentiate urological problems more efficiently
- Diagnose urinary retention
- Identify blocked Foley catheter
- Verify empty bladder
- Determine hydration status
- Differentiate between types of incontinence to determine appropriate care

MANAGE AND TREAT

- Establish volume (vs. time) based intermittent catheterization protocols
- Discontinue Foley catheter use
- Evaluate need to catheterize after Foley catheter removal
- Establish voiding trials
- Evaluate need to catheterize during intermittent catheterization
- Establish voiding schedules
- Assist in bladder retraining (biofeedback)

PREVENT

- Eliminate unnecessary catheterization
- Reduce rates of nosocomial UTI
- Minimize antibiotic use associated with UTI
- Minimize catheter-related damage to upper urinary tract
- Prevent undiagnosed (chronic) urinary retention
- Prevent post-operative (acute) urinary retention
- Prevent bladder overdistension
- Reduce incontinent episodes

Specifications - BVI 3000

Range:	Bladder volume range 0 to 999 ml	Resolution:	Axial Resolution: 1.55mm, Radial Resolution: 2 degrees
Accuracy:	The following accuracy specification assumes usage per instructions, scanning a Diagnostic Ultrasound Corporation Tissue Equivalent Phantom: 0 to 699 ml ± 20%, ± 20 ml; 700 to 999 ml ± 25%, ± 25 ml	Ultrasound Output Parameters:	Temporal Average Power: 1 mW maximum Focal 20 dB Beam-Area: 1.4 cm ² Transducer Dimension: 3 mm diameter Working Frequency: 2 MHz Peak Instantaneous Intensity: 14 W/cm, maximum Pulse Repetition Frequency: 180 pulses/second Scan angle: 120 degrees Mode: V _{MODE} (multiple, aligned B-mode images)
Scan Time:	Less than 5 seconds	Operating Conditions:	Temperature: +10° C to +40° C Humidity: 30% to 75%, non-condensing
Weight:	Less than 5 lbs.		
Power:	7.2v NiMH battery pack (2 supplied). Six hours continuous use on one charge. Battery low message		
Dimensions:	Width: 9.0" (23cm), Length: 11.25" (32cm), Height: 2.75" (7cm)		
Display:	Liquid crystal		

The BladderScan BVI 3000 is CE Marked in accordance with the Medical Device Directive and the Diagnostic Ultrasound quality system is Quality System Certified to ISO 13485:2003 standards. US Patent No. 4926871, 5235985. INTL Patents Pending. BladderScan[®] and V_{MODE}[®] are registered trademarks of Diagnostic Ultrasound Corporation. Copyright ©2005. All rights reserved.



DIMENSIONS WITH CART:
15x15x30

DIAGNOSTIC
ULTRASOUND

Corporate Headquarters

21222 30th Drive SE / Suite 120 / Bothell, WA 98021 USA

425.867.1348 / 800.331.2313 / 425.883.2896 Fax

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www.dxu.com



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One Look and the Difference is Clear

XDI patent-pending imaging technology drives X-Porte's image clarity and resolution by significantly reducing visual clutter.

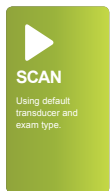


The World's First Ultrasound Kiosk

X-Porte represents an entirely new approach to clinical ultrasound. Its imaging, features, and educational resources are fluidly brought together in a convenient, all-in-one kiosk design.

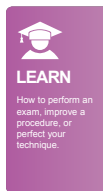
At the sweep of your hand, it responds so quickly and intelligently to your imaging needs, you'll know it was created precisely for professionals like you. Its self-explanatory control panel makes system navigation a breeze, and its sealed touch screen has no buttons for pathogens to hide behind.

X-Porte's slender profile makes it easy to maneuver alongside beds and exam tables for point-of-care visualization and procedures. For portability and durability during transport, its screen folds down and its stand lowers making X-Porte even more compact for navigating busy corridors. The X-Porte ultrasound core can be detached easily from the kiosk to provide another configuration option. For servicing, nothing could be more convenient than X-Porte's five-year warranty and removable engine.



Breakthrough XDI Imaging

X-Porte's XDI beam-forming technology was created to meet the challenge of side-lobe artifacts, so now you can scan with image clarity, resolution, and color sensitivity never before seen in point-of-care ultrasound systems.



Real-Time Scan Along Learning

For instant reference, scan along with an onboard library of Visual Guides featuring step-by-step learning tutorials. Use X-Porte's Visual Guides for comparing 3D beam-direction animations to corresponding 2D ultrasound images.



Gesture-Driven Interface

Optimized workflow is always at your fingertips. Easily customize the interface to suit your needs. Don't like the order of menu items? Change them. Too many controls? Minimize them.



Designed from the ground up for your work style and work environment, X-Porte offers you an entirely new ultrasound experience by providing these revolutionary tools in a unique, integrated system exclusive to SonoSite.

SYSTEM SPECIFICATIONS

Stand Dimensions: 26.4" L x 21.2" W
 Stand Height: max 64" (monitor up) / min 42.2" (monitor down)
 Height Adjustment: 9" travel
 12.1" Capacitive Touch Screen (multi-touch gestures for system controls)
 System Boot-up: <20 secs
 HD Monitor: 19" diagonally
 Control Panel Tilt Adjustment: 0 to 110 degrees
 Clinical Monitor Viewing: 85 degrees left and right, 60 degrees up, 80 degrees down
 Architecture: All digital broadband
 Dynamic Range: Up to 183 dB
 Gray Scale: 256 shades
 HIPAA Compliance: Comprehensive toolset

IMAGE MODES

2D, Broadband imaging
 Tissue Harmonic Imaging
 Pulse Inversion Harmonic Imaging
 M-Mode
 Velocity Color Doppler
 Color Power Doppler
 Pulsed Wave Doppler
 Pulsed Wave Tissue Doppler
 Continuous Wave Doppler, ECG

IMAGE PROCESSING

Extreme Definition Imaging (XDI)
 SonoAdapt Tissue Optimization
 SonoHD2 Imaging Technology
 SonoMB Multibeam Technology
 Dual Imaging
 Dual Color Imaging
 AutoGain and AutoGain Brightness Adjust
 Restore Default Gains
 Dynamic Range
 Duplex Imaging
 8x Zoom Capability
 Post Processing: Dynamic Range, Zoom
 2D Image Optimization: Average and Difficult
 Overall Gain, Near and Far Field Gain Control
 Color and Doppler Flow Optimization (low, medium, high)
 Color Variance Mode
 2D Reduced Imaging Sector

STEEP NEEDLE PROFILING

(Available on these transducers and exams.)
 HFL50xp: Breast, MSK, Nerve, Small Parts
 L38xp: Nerve, Venous
 L25xp: Nerve, Venous

POWER SUPPLY

System operates via battery or AC Power
 Rechargeable lithium-ion battery
 Battery life: 1.0 hour, 3 days on idle
 Battery charge time: 1.5 hours

100-240VAC

OTHER HIGHLIGHTS

Programmable Controls
 Labeling: Predefined Labels, Customized Labels, Predefined Pictograms
 Worksheets: Acute Care Worksheets (ACEP Guidelines) and Musculoskeletal Worksheets
 Steep Needle Profiling software
 *Embedded DVR (Digital Video Recorder)
 *Triple Transducer Connect
 *Storage Basket

**Standard with X-Porte*

ONBOARD IMAGE AND CLIP STORAGE REVIEW

2D Cine Review – 20 seconds
 PW, CW, M-Mode Cine Review – 16 seconds
 Internal Flash Memory – 64 GB
 Thumbnail review of saved images and clips
 Prospective and Retrospective Clip Store
 Auto Clip Export (auto export to USB at end of study)
 Video clip playback at 1, ½ or ¼ of the captured rate
 Video Clip Save Lengths: 2, 4, 6, 10, 15, 30 and 60 seconds.
 Annotations on recalled images
 Image Format: jpeg, avi, bmp
 Export Format: html
 JPEG Compression Options: High, Medium, Low

DATA MANAGEMENT AND WIRELESS

5 USB 2.0 Ports
 Ethernet Port
 DVR USB Port
 ECG Connector
 Barcode auto-query (populates patient's demographic from worklist)
 DICOM Image Management: Print, Store, Modality Worklist, Perform Procedure Step (PPS), Storage Commitment
 DICOM Image Management: Exam Routing for Diagnostic, Procedure, Education Exams
 Embedded Wireless Option: 802.11 (B, G, and N networking)

ACCESSORIES

Medical Grade Black and White Printer (Sony UP-D897 USB B&W printer)
 PowerPark
 USB Bar Code Reader
 Footswitch
 ECG Module

SUPPORTED LANGUAGES

English, French, Italian, Portuguese, Spanish, German

LEARNING PACKAGES

Ultrasound Imaging Basics; Packages for Acute Care, Procedures, Anesthesiology, On-board System Help

Note: Desktop configuration available.

EQUIP# IMU02



Applications:
 abdominal, musculoskeletal, nerve, ob, gyn
 5-2 MHz Curved
 Scan depth: 30 cm



Applications:
 breast, musculoskeletal, nerve, small parts
 15-6 MHz Linear
 Scan depth: 6 cm



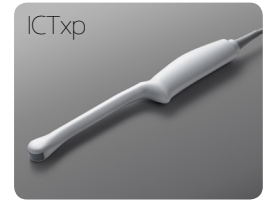
Applications:
 nerve, arterial, venous, small parts
 10-5 MHz Linear
 Scan depth: 9 cm



Applications:
 cardiac, abdomen, ob, lung
 5-1 MHz Phased
 Scan depth: 35 cm



Applications:
 nerve, musculoskeletal, arterial, superficial, ophthalmic, venous
 13-6 MHz Linear
 Scan depth: 6 cm



Applications:
 ob, gyn
 9-5 MHz Curved
 Scan depth: 15 cm

Needle guides and kits available with the following transducers:

L38xp, HFL50xp, C60xp, ICTxp, L25xp, and P21xp.

A transverse needle guide is available with the L25xp.



FUJIFILM SonoSite, Inc.
 Worldwide Headquarters
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 Tel: +1 (425) 951-1200 or +1 (877) 657-8050
 Fax: +1 (425) 951-6800 E-mail: edge@sonosite.com
www.sonosite.com/products/x-porte

EQUIP# LFT01

ARJOHUNTLEIGH

GETINGE GROUP

SARA STEDY
ENHANCED STANDING AID



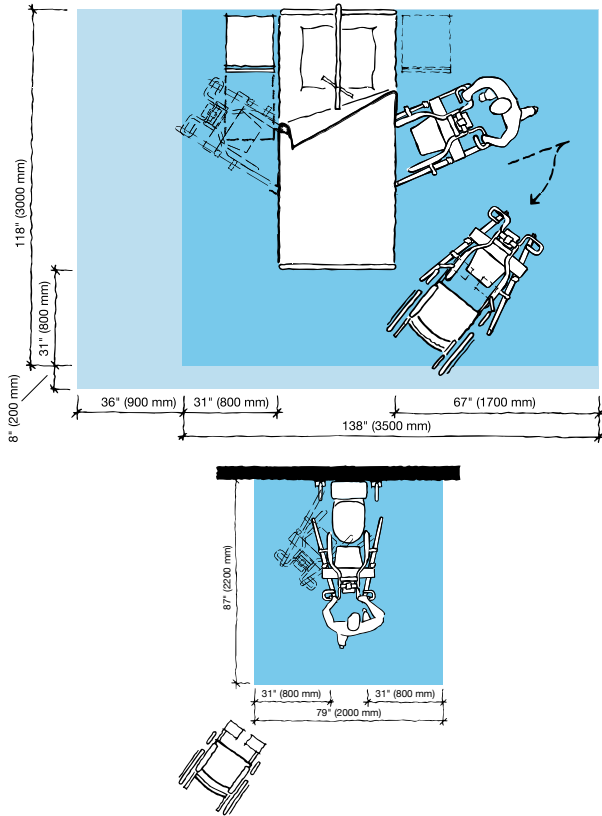
...with people in mind

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PRODUCT SPECIFICATIONS

EQUIP# LFT01

Space requirement



- Blue area shows the minimum working area required for the staff to be able to use the mechanical aids in an ergonomic way from one side.
- Light blue area shows required extension of working area to facilitate activities from either side to provide adequate access for the resident, mechanical aid and assisting caregiver.

Mobility Gallery™

Suitable for Albert, Barbara and Carl



- A Albert**, who is ambulatory and independent
- B Barbara**, who can support herself to some degree
- C Carl**, who sits in a wheelchair and has little capacity to support himself

Please contact ArjoHuntleigh for further information on the *Mobility Gallery™*.

ARJOHUNTLEIGH

GETINGE GROUP

www.ArjoHuntleigh.com

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Addison, Illinois 60101
Phone: 800-323-1245
Fax: 630-925-7969

ArjoHuntleigh Canada Inc.
1575 South Gateway Road Unit C
Mississauga, Ontario L4W 5J1
CANADA
Phone: 800-665-4831
Info.Canada@ArjoHuntleigh.com

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Product information

Weight	65 lbs (29.4 kg)
Max. safe working load	400 lbs (182 kg)
Total length	32 3/4" (905 mm)
Total height	41 1/2" (1051 mm)
Height of Chassis	4" (100 mm)
Internal width of legs open	24 3/4" (729 mm)
Low friction castors, the rear two with brakes	

Lifter - Protection class IPX4

Approvals

This product is in compliance with current legislation and applicable product standards

Use only ArjoHuntleigh designed parts, i.e. parts specifically designed for the purpose, on equipment and products supplied by ArjoHuntleigh. As our policy is one of continuous development, we reserve the right to modify designs and specifications without prior notice. © and ™ are trademarks belonging to the ArjoHuntleigh group of companies. © ArjoHuntleigh, 2011

Accessories

Compatible ArjoHuntleigh Slings and *Flites* (disposable slings)

Using Sara Steady

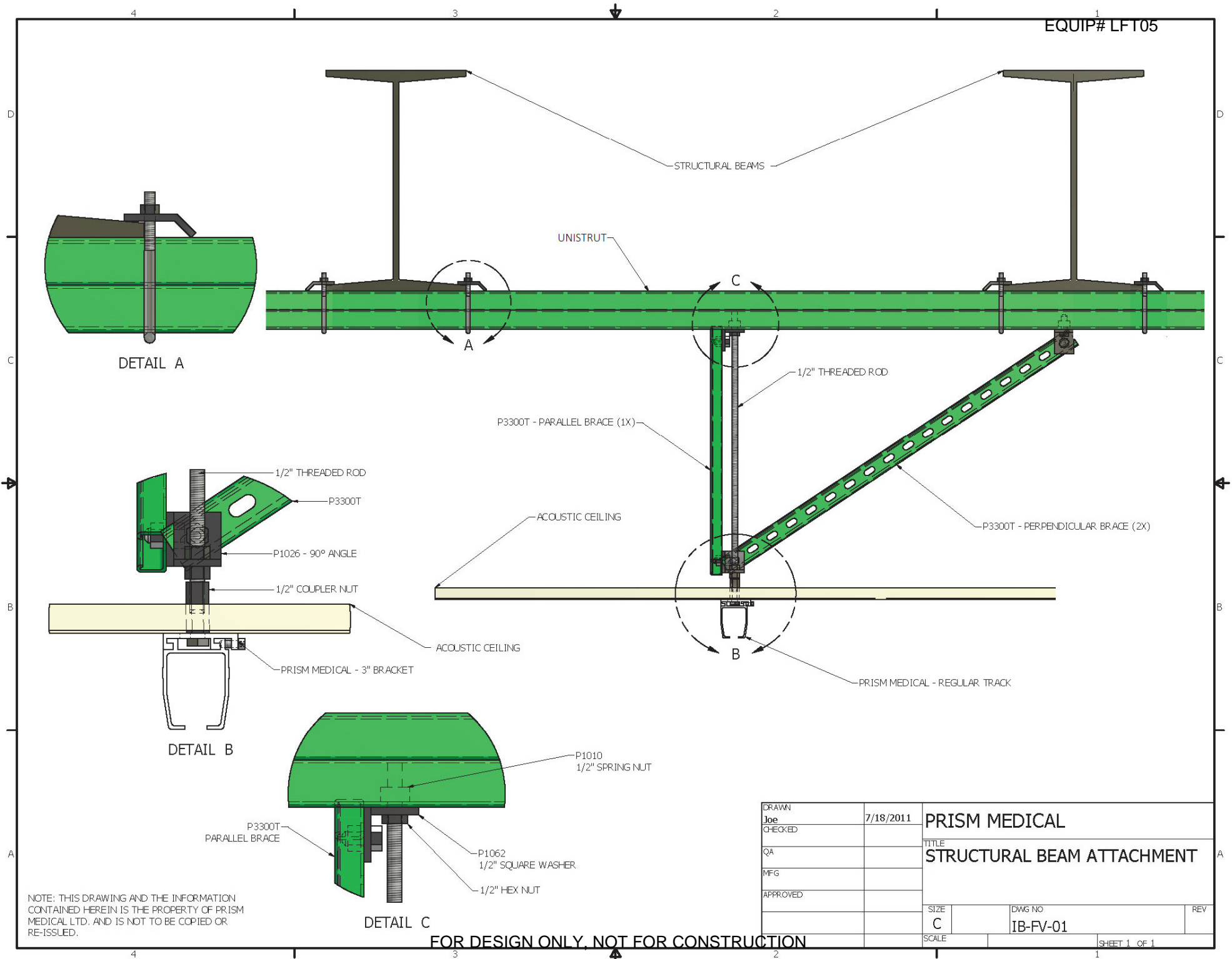
The ArjoHuntleigh *Mobility Gallery* provides a general indication of the mobility categories that can benefit from using the *Sara Steady*. However, support aid selection should always be based on an individual clinical assessment by a doctor, registered nurse, certified clinician or similar healthcare professional.

The HoverJack™ Cart



is designed to hold the air supply in its top basket and the HoverJack™ Patient Lift in the lower basket. The cart can be used for storage and transportation of the HoverJack™ Lift.

Dimensions: 25x18x38 Weight: 26lbs



DETAIL A

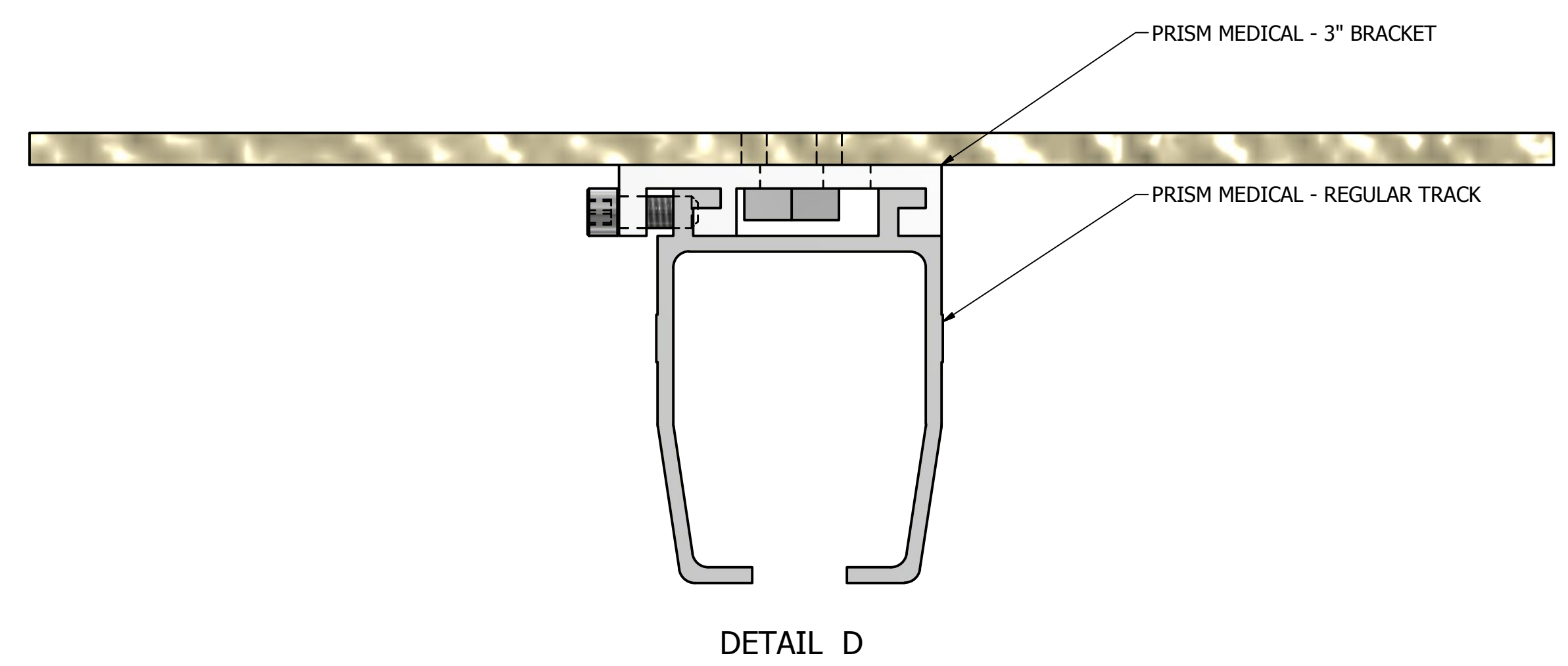
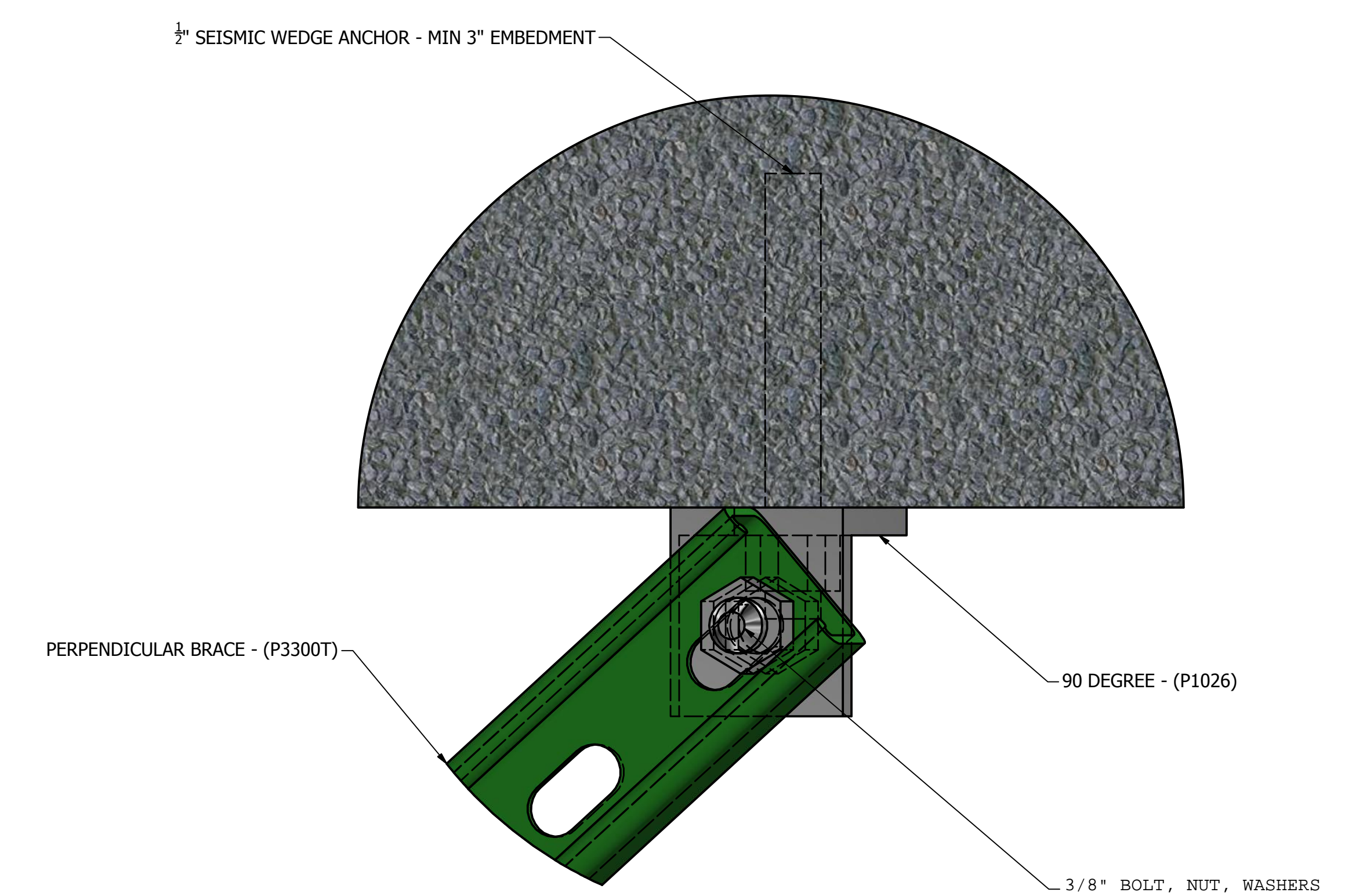
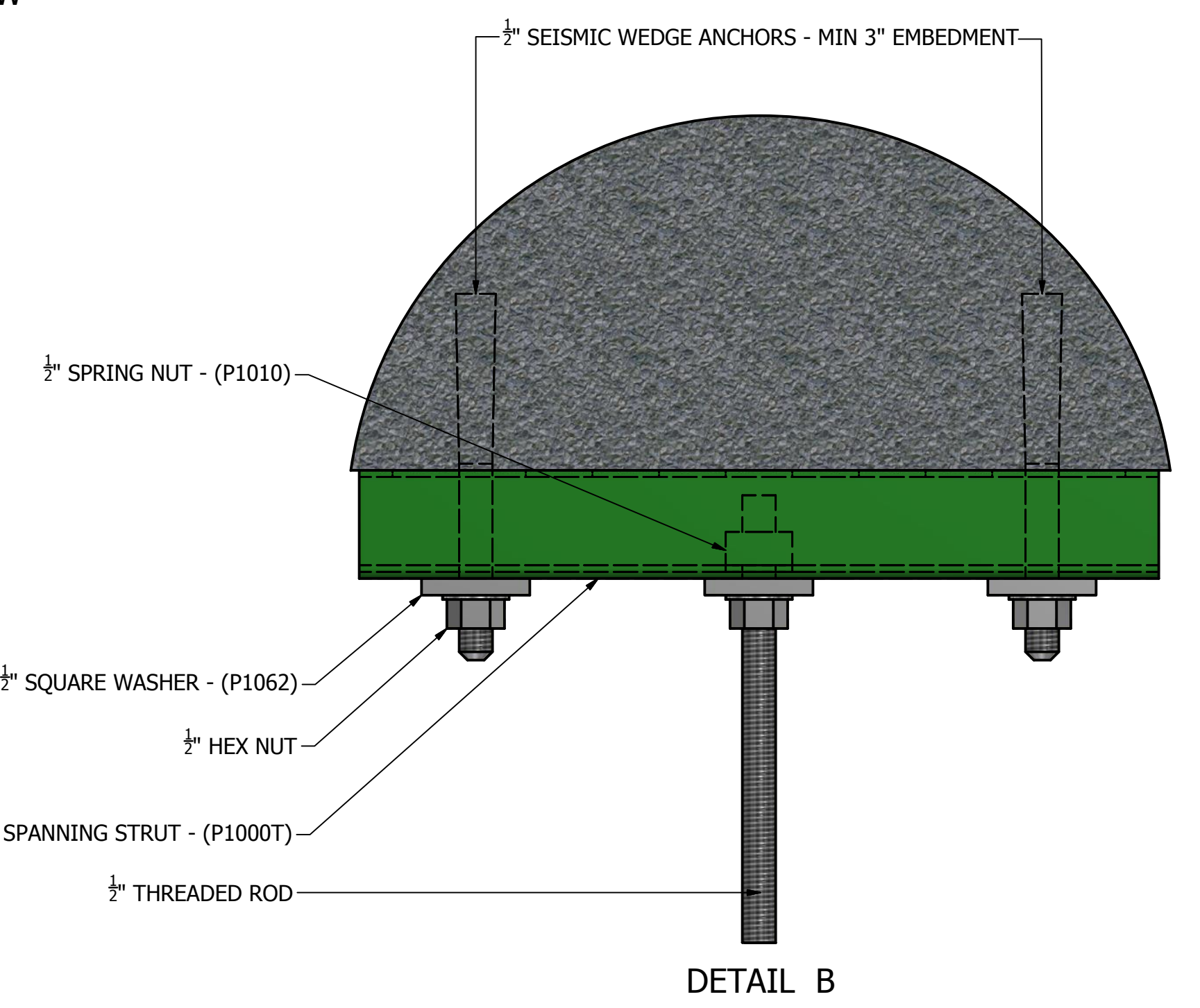
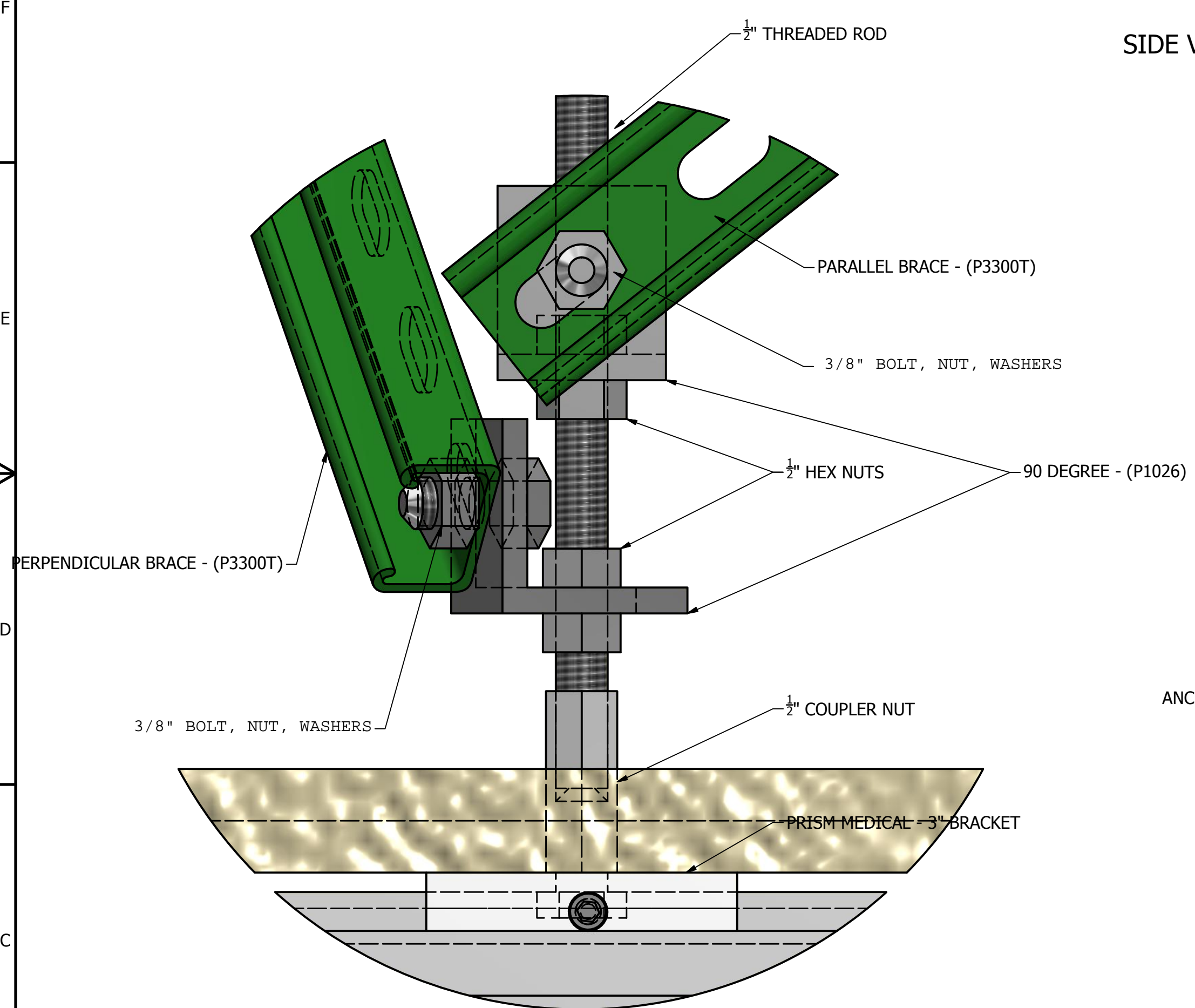
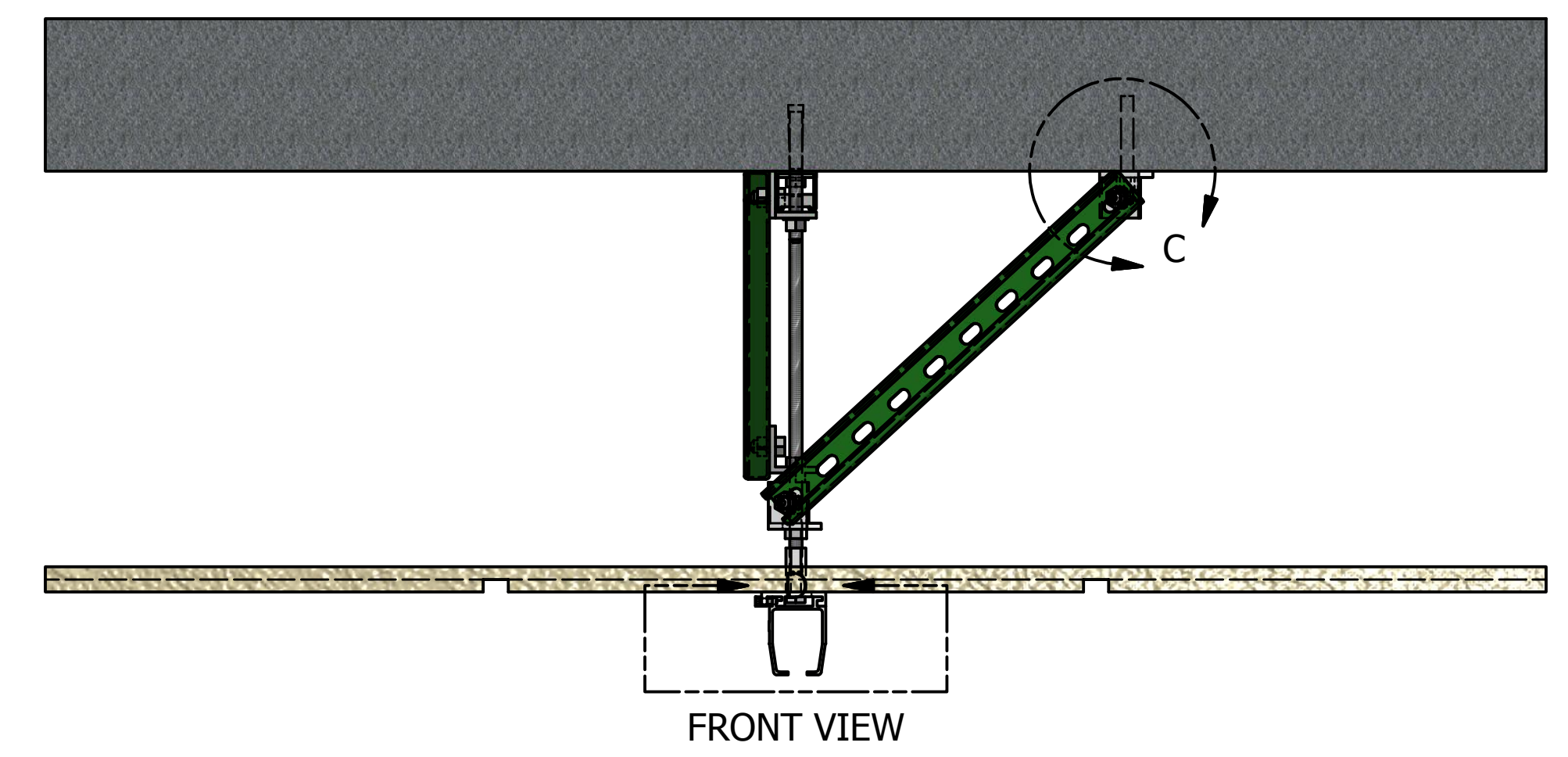
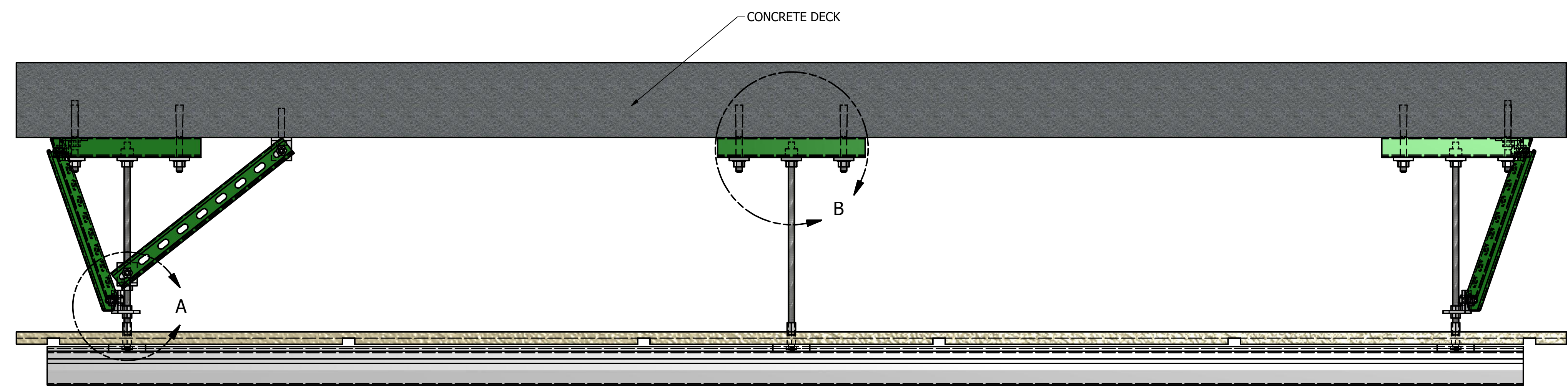
DETAIL B

DETAIL C

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DRAWN Joe	7/18/2011	PRISM MEDICAL	
CHECKED		TITLE	
QA		STRUCTURAL BEAM ATTACHMENT	
MFG		SIZE	DWG NO
APPROVED		C	IB-FV-01
		SCALE	REV
			SHEET 1 OF 1



DRAWN jdewey	12/19/2012	PRISM MEDICAL	
CHECKED		TITLE	
QA		ATTACHMENT DETAIL	
MFG		CONCRETE DECK	
APPROVED		SIZE	DWG NO
		24 x 36 (inches)	Concrete Seismic Attachment - Flush
		SCALE	REV
			SHEET 1 OF 1

Pyxis[®] SMART Remote Manager

Automated temperature-sensitive medication dispensing and monitoring system



The Pyxis[®] SMART Remote Manager is the first system to automate temperature-sensitive medication distribution and storage device temperature monitoring. It integrates with the Pyxis[®] MedStation[™] system to provide controlled point of use access to temperature sensitive medication and monitor internal temperatures of storage devices. In addition, the system electronically archives transaction and temperature data and generates reports necessary for regulatory compliance, inventory management and billing.

Pyxis[®] SMART Remote Manager includes a software module, electronic locking latch and a temperature sensor with digital display. It can be installed on many commercially available refrigerators.

Key advantages

Supports compliance with Joint Commission and regulatory requirements by helping to secure temperature-sensitive medication, track controlled substances and manage storage device temperature

Improves workflow efficiency by streamlining temperature-sensitive medication distribution and storage device temperature management providing more time for patient care

Increases patient safety and helps protect a facility's bottom line by warning users if medication has been exposed to an inappropriate temperature and facilitating a rapid response to a refrigerator failure preventing loss or harm

Specifications

Height	6.9"
Depth	5.2"
Width	2.3"
Weight	3.9 lbs
Temp	Typical accuracy +/- 1.9 degrees Fahrenheit, drift .16 degrees Fahrenheit per 1,000 hrs
Power	50 milli-amps at 36 VDC. The Pyxis® SMART Remote Manager is a peripheral device - power is supplied by a Pyxis® Main.

Guide to selecting compatible refrigerators

Pyxis® SMART Remote Manager and Pyxis Remote Manager

About this guide

This guide provides the criteria for determining which refrigerators are compatible with the Pyxis SMART Remote Manager or the Pyxis Remote Manager.

For additional information or assistance, call the Technical Support Center at 800.625.6535 (from the United States, Canada and Puerto Rico) or 858.617.2000 (worldwide).



Additional clearance required for Pyxis SMART Remote Manager and Pyxis Remote Manager

Pyxis SMART Remote Manager and Pyxis Remote Manager require additional clearance when they are installed on a refrigerator. See Figure 2 for clearance area requirements.

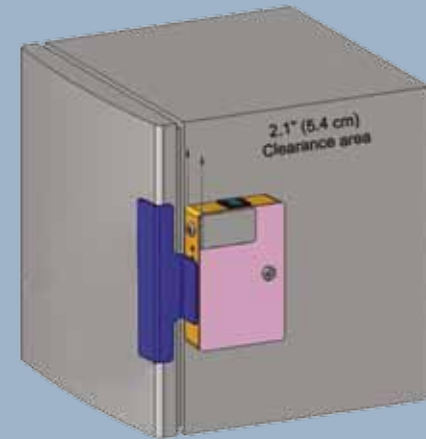


Figure 2. Clearance area requirements

Distance from the refrigerator door to the refrigerator cabinet

Figures 3 and 4 show top views of the gap between the outside face of the refrigerator door and the refrigerator cabinet. In order for Pyxis SMART Remote Manager or Pyxis Remote Manager to function properly, the maximum distance between these two surfaces must not exceed the following dimensions:

- 1.9" (4.8 cm) for refrigerators with flat-door surfaces (see Figure 3)
- 2.0" (5.1 cm) for refrigerators with round-door surfaces (see Figure 4)

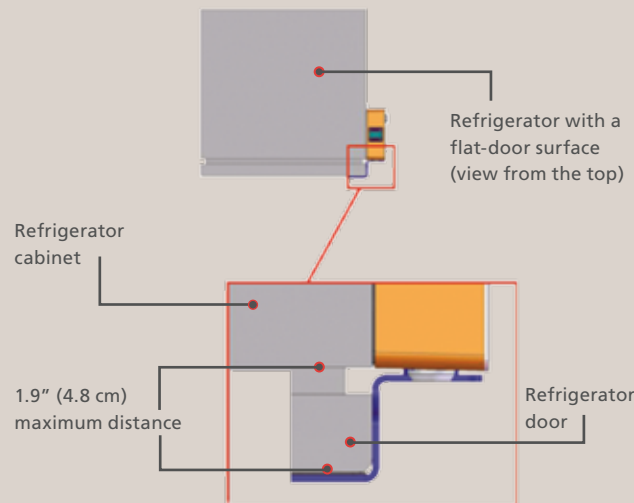


Figure 3. Distance from the refrigerator door to the refrigerator cabinet, flat-door surface

FOR DESIGN ONLY, NOT FOR CONSTRUCTION

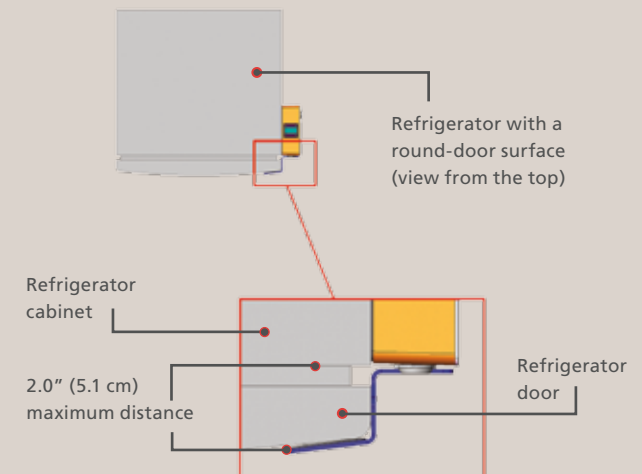


Figure 4. Distance from the refrigerator door to the refrigerator cabinet, round-door surface

Pyxis Remote Manager and Pyxis SMART Remote Manager

For Pyxis Remote Manager and Pyxis SMART Remote Manager specifications, see *Pyxis Remote Manager and Pyxis SMART Remote Manager specifications* on page 19.

Pyxis Remote Manager

Pyxis Remote Manager is an automated medication management system for temperature-sensitive medication. It provides controlled point-of-use access, electronically tracks and records transaction data, and generates reports necessary for inventory management, billing, and regulatory compliance. Pyxis Remote Manager includes an electronic locking latch that can be installed on many commercially available refrigerators or warmers.

Pyxis SMART Remote Manager

The Pyxis Secure Monitor Alarm Record Temperature (SMART) Remote Manager is an automated medication management system for temperature-sensitive medication dispensing and for storage device temperature management. Pyxis SMART Remote Manager provides controlled access, monitors internal storage temperatures of refrigerators or warming devices, provides a warning when temperatures fall outside of user-defined limits, electronically archives transaction and temperature data, and generates reports necessary for regulatory compliance, inventory management, and billing.

Like Pyxis Remote Manager, Pyxis SMART Remote Manager includes an electronic locking latch that can be installed on many commercially available refrigerators or warmers. Pyxis SMART Remote Manager also includes a digital temperature readout on top of the unit.



Pyxis SMART Remote Manager units are available for refrigerator doors that open from either the left or from the right.

Pyxis Remote Manager and Pyxis SMART Remote Manager specifications

The following table provides specifications for Pyxis Remote Manager and Pyxis SMART Remote Manager units.

CAUTION




Do not position a Pyxis Remote Manager or Pyxis SMART Remote Manager refrigerator on top of a Pyxis MedStation ES system auxiliary cabinet. Doing so can exceed the load limit of the cabinet.

Graphic	Equipment	Imperial dimensions (excluding door latch plate)	Metric dimensions (excluding door latch plate)
	Pyxis Remote Manager	4.75" (W) 2.16" (D) 6.76" (H)	12.065 cm (W) 5.486 cm (D) 17.170 cm (H)
	Pyxis SMART Remote Manager	4.75" (W) 2.16" (D) 6.76" (H)	12.065 cm (W) 5.486 cm (D) 17.170 cm (H)

For more detailed information about refrigerators that can be used with Pyxis Remote Manager and Pyxis SMART Remote Manager, see the *CareFusion Guide to selecting compatible refrigerators, Pyxis[®] SMART Remote Manager and Pyxis[®] Remote Manager*.

Pyxis MedStation ES main cabinet specifications

The following table provides specifications for Pyxis MedStation ES main cabinets.

Graphic	Equipment	Imperial dimensions	Metric dimensions	BTUs	Steady power (Watts)	Peak power (Watts)
	Six-drawer	23" (W) 27" (D) 55" (H)	58.4 cm (W) 68.6 cm (D) 139.7 cm (H)	409	80	120
	Two-drawer	23" (W) 27" (D) 28" (H)	58.4 cm (W) 68.6 cm (D) 71.1 cm (H)	409	80	120
	Zero-drawer (connected to auxiliary cabinets)	23" (W) 27" (D) 16" (H)	58.4 cm (W) 68.6 cm (D) 40.6 cm (H)	273	65	80





Pyxis MedStation ES system specifications

Pyxis MedStation ES system server specifications

The Pyxis MedStation ES system includes three available console server options:

- Software only (installed on an existing customer server)
- Virtual machine (VM) + software (installed on an existing customer server)
- Turnkey solution (VM + software installed on one of the Dell™ servers shown below)

The following table provides physical specifications for Pyxis MedStation ES system Dell servers.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	Dell PowerEdge™ T310 tower server	8.6" (W) 20.5" (D) 17.3" (H)	21.8 cm (W) 52.1 cm (D) 43.9 cm (H)
	Dell PowerEdge T410 tower server	8.6" (W) 17.5" (D) 24.3" (H)	21.8 cm (W) 44.5 cm (D) 61.7 cm (H)
	Dell PowerEdge R310 rack server	17.1" (W) 24" (D) 1.7" (H)	43.4 cm (W) 61.0 cm (D) 4.3 cm (H)
	Dell PowerEdge R410 rack server	17.1" (W) 24.7" (D) 1.7" (H)	43.4 cm (W) 62.7 cm (D) 4.3 cm (H)

Weight specifications

The following table provides approximate weight specifications for Pyxis MedStation ES system components.

Equipment	Imperial weight	Metric weight
Main cabinet (without drawers, unless specified)		
Six-drawer	165.5 lb	75.1 kg
Four-drawer bin	165.5 lb	75.1 kg
Two-drawer	100.7 lb	45.7 kg
Zero-drawer	48.0 lb	21.8 kg
Auxiliary (without drawers, unless specified)		
Seven-drawer	133 lb	60.3 kg
Two-drawer	100.7 lb	45.7 kg
Double-column eight-door	470.5 lb	213.4 kg
Single-column four-door	314 lb	142.4 kg
Half-height tower auxiliary	260 lb	118.0 kg
Pyxis MedStation ES system consoles		
Dell PowerEdge T310 tower server	51.8 lb	23.5 kg
Dell PowerEdge T410 tower server	62.6 lb	28.4 kg
Dell PowerEdge R310 rack server	35.0 lb	15.9 kg
Dell PowerEdge R410 rack server	35.0 lb	15.9 kg
Drawers/pockets		
Matrix drawer	26 lb	11.6 kg
Matrix drawer (return bin)	30 lb	13.6 kg
CUBIE drawer set (no pockets)	52.2 lb	23.7 kg
CUBIE drawer set (with pockets)	63 lb	28.6 kg
CUBIE Pocket 1x1	2.6 oz	0.07 kg
CUBIE Pocket 1x2	4.7 oz	0.13 kg
CUBIE Pocket 1x3	7.9 oz	0.22 kg
Full-Height CUBIE drawer (no pockets)	38.6 lb	17.5 kg
Full-Height CUBIE pocket 1X	5.4 oz	.15 kg
Full-Height CUBIE pocket 2X	9.0 oz	.26 kg
Full-Height CUBIE pocket 3X	12.2 oz	.35 kg
Full-Height CUBIE pocket 5X	19.7 oz	.56 kg

CPU and power specifications

Description	Equipment	Specification
AC power (line Voltage)	Main (6, 4, 2, 0)	100–240 V, 50–60 Hz
	Column	100–240 V, 50–60 Hz
Load current (Amps)	Main (6, 4, 2, 0)	1 Amp NOM, 3 Amp MAX
	Column	1 Amp NOM, 3 Amp MAX
Circuit breakers	All	One for the system
Heat evolved	Main	2-, 4- and 6-drawer Main approx. 409 BTU/hr.
	Aux	Add 21 BTU for each auxiliary.
	Column	Add 21 BTU for each auxiliary.
Battery	Main	Five-year life span
Console server	Dell PowerEdge T310 tower server	Power supply: Single cabled power supply (375 W) / optional redundant power supply (400W) UPS (Uninterruptible Power supplies): 500 W–2700 W Extended Battery Module (EBM) Network Management Card
	Dell PowerEdge T410 tower server	Power supply: Non-Redundant, 525W (80+) Optional Redundant, 580W (80+ GOLD—80 PLUS energy efficiency rating) Auto Ranging (100V~240V) UPS: 500 W–2700W EBM Network Management Card
	Dell PowerEdge R310 rack server	Power supply: One non-redundant 350W power supply Two hot-pluggable redundant 400W hot-plug power supplies UPS: 1000 W–5600 W 2700 W–5600 W High Efficiency Online EBM Network Management Card
	Dell PowerEdge R410 rack server	Power supply: Non-Redundant, 480W (80+ BRONZE) Optional Redundant, 500W (80+ SILVER) Auto Ranging (100V~240V) UPS: 1000W-5600W 2700W-5600W High Efficiency Online EBM Network Management Card

Cabinet security features

Main cabinets, seven-drawer auxiliary cabinets

Keyed rear panel locks

The cabinet's removable rear panel is secured to the cabinet with two tubular keyed locks that are keyed differently. These locks are located on the top left and right sides of the rear panel. Customers retain control of the keys to these locks at all times, and CareFusion field personnel are prohibited from having these keys in their possession.

The bottom of the rear panel is retained with two sheet metal tabs that insert into holes in the bottom of the cabinet. If the rear panel is pried off of the cabinet, substantial visible structural damage will be evident.

Cabinet security anchor cable

A one-inch hole located at the bottom rear of each cabinet allows the attachment of a cabinet security anchor cable that prevents removal of the entire cabinet.

Additional security features

If the locked cabinet rear panel is removed and a drawer is removed by manually pivoting the drawer latch arm, a speaker in the Pyxis MedStation ES system E-drawer will sound and alarm, and an illegal access message will be logged in the system for the drawer. This message contains the drawer number, and the date and time of access.

If a Pyxis MedStation ES system main cabinet is unplugged from its wall power outlet, the station will go into backup power mode and continue running on the 12-Volt backup battery in the main cabinet E-drawer. A message is logged into the system indicating that power was lost at the station at the date and time of the incident. Any unsaved data is saved, and the station then shuts down.

Double-column eight-door and single-column four-door auxiliary cabinets

Each Pyxis MedStation ES system eight-door and four-door tower auxiliary cabinet includes a top grill with two tubular locks that are keyed differently. Customers retain control of the keys to these locks at all times, and CareFusion field personnel are prohibited from having these keys in their possession.

Unlocking and opening the cabinet top grill provides access to the cabinet manual door latch release.

Pyxis MedStation® ES System

Specifications Guide

January 2012
DME: 10000180063 Ver 00

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Pyxis MedStation ES auxiliary cabinets

Seven-drawer cabinet

Pyxis MedStation ES system-seven-drawer auxiliary cabinets are fabricated from 18-gauge sheet metal. Each cabinet structure consists of a top panel, bottom panel, right panel, left panel, and middle shelf. A removable, locking rear panel covers the back of the cabinet. Each seven-drawer auxiliary cabinet includes a plastic top cover that fastens to the cabinet structural top panel.

All seven-drawer auxiliary cabinets have two drawer slide brackets for each cabinet drawer position. A drawer release lever at the rear of each bracket allows removal of an entire drawer from the front of the cabinet. The cabinet locking rear panel must be removed to access these release levers.

Each Pyxis MedStation ES system seven-drawer auxiliary cabinet includes casters that allow the cabinet to be easily moved and levelers for leveling the cabinet on an uneven floor. For Pyxis MedStation ES system seven-drawer auxiliary cabinet specifications, see *Seven-drawer auxiliary cabinet* on page 7.

Double-column eight-door and single-column four-door cabinets

Pyxis MedStation ES system eight-door and four-door tower auxiliary cabinets are fabricated primarily from 18-gauge sheet metal. The cabinets have four or eight doors respectively that are fabricated primarily from clear acrylic. Cabinets with solid, 16-gauge steel doors are also available.

Cabinet door latches are unlocked using the Pyxis MedStation ES system application. Adjacent pairs of doors at the top and bottom halves of the cabinets can be coupled together, with each set of coupled doors functioning as one Pyxis MedStation ES system device. Each door secures a cabinet storage shelf area with configurable wire shelves. A manual door latch release is located under a locking top grill at the top front of each cabinet.

The top of each cabinet houses an AC power panel with a cabinet light switch. The interior of each cabinet is illuminated by a fluorescent bulb that provides light through diffusing panels inside the cabinet. The light is accessible through a center back panel on each cabinet.

Each of these auxiliary cabinets includes casters, which allow the cabinet to be moved, and levelers for leveling the cabinet on an uneven floor. Lower the levelers to keep the cabinet from moving.

For Pyxis MedStation ES system eight-door and four-door auxiliary cabinet specifications, see *Double-column, single-column, and half-height tower auxiliary cabinets* on page 8.

Half-height tower cabinet

Each Pyxis MedStation ES system half-height tower auxiliary cabinet is fabricated primarily from 18-gauge sheet metal. Each cabinet has two doors fabricated primarily from clear acrylic. Cabinets with solid, 16-gauge steel doors are also available.

The door latches are unlocked by using the Pyxis MedStation ES system application. The doors secure cabinet storage shelf areas with configurable wire shelves. A manual door latch release is located under a locking grill at the top left side of the cabinet.


Each of these auxiliary cabinets includes casters, which allow the cabinet to be moved, and levelers for leveling the cabinet. Lower the levelers to keep the cabinet from moving.

For Pyxis MedStation ES system half-height tower cabinet specifications, see *Double-column, single-column, and half-height tower auxiliary cabinets* on page 8.

Pyxis MedStation ES system auxiliary cabinet specifications

Seven-drawer auxiliary cabinet

The following table provides specifications for Pyxis MedStation ES system seven-drawer auxiliary cabinets.

Graphic	Equipment	Imperial dimensions	Metric dimensions	BTUs	Steady power (Watts)	Peak power (Watts)
	Seven-drawer	23" (W) 27" (D) 47" (H)	58.4 cm (W) 68.6 cm (D) 119.4 cm (H)	N/A	N/A	N/A

Double-column, single-column, and half-height tower auxiliary cabinets

The following table provides specifications for Pyxis MedStation ES system double-column, single-column, and half-height tower auxiliary cabinets.

Graphic	Equipment	Imperial dimensions	Metric dimensions	BTUs	Steady power (Watts)	Peak power (Watts)
	Double-column, eight-door	52" (W) 28" (D) 80" (H)	132.1 cm (W) 71 cm (D) 203.2 cm (H)	222	65	65
	Single-column, four-door	31" (W) 28" (D) 80" (H)	78.7 cm (W) 71.0 cm (D) 203.2 cm (H)	222	65	65
	Half-height tower	30" (W) 28" (D) 43" (H)	76.2 cm (W) 71.0 cm (D) 109.2 cm (H)	N/A	N/A	N/A


Additional cabinet components

The following table provides information about additional Pyxis MedStation ES system cabinet components.

Graphic	Equipment	Description
	<p>Locking rear panel</p> <ul style="list-style-type: none"> Main cabinet, six-drawer Main cabinet, two-drawer Auxiliary cabinet, seven-drawer 	<p>Secures access to drawer manual release levers.</p>
	<p>Locking top grill</p> <ul style="list-style-type: none"> Auxiliary cabinet, double-column, eight-door Auxiliary cabinet, single-column, four-door 	<p>Secures access to door manual release lever.</p>
	<p>Locking top grill</p> <ul style="list-style-type: none"> Auxiliary cabinet, half-height tower 	<p>Secures access to door manual release lever.</p>
	<p>Casters and levelers</p> <ul style="list-style-type: none"> Main cabinet, six-drawer Auxiliary cabinet, seven-drawer 	<p>Casters—make cabinet mobile. Levelers—adjust to level cabinet.</p>
	<p>Casters and levelers</p> <ul style="list-style-type: none"> Auxiliary cabinet, double-column, eight-door Auxiliary cabinet, single-column, four-door Auxiliary cabinet, half-height tower 	<p>Casters—make cabinet mobile. Levelers—adjust to level cabinet.</p>
	<p>Levelers</p> <ul style="list-style-type: none"> Main cabinet, two-drawer Main cabinet, zero-drawer 	<p>Adjust to level main unit.</p>

Pyxis MedStation ES system auxiliary cabinet cables

The following table provides specifications for Pyxis MedStation ES system auxiliary cabinet cables.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	PyxiBus bus cables	12 feet 25 feet 50 feet	3.66 meters 7.62 meters 15.24 meters



Advanced automated medication management system

EQUIP# MED04

Pyxis MedStation™ 4000 system

Pyxis MedStation 4000 mains



Pyxis MedStation 4000
6-drawer main
22.8" W x 27" D x 55" H



Pyxis MedStation 4000
4-drawer main plus bin
22.8" W x 27" D x 55" H



Pyxis MedStation 4000
2-drawer main
22.8" W x 27" D x 27.8" H



Pyxis MedStation 4000
0-drawer main
22.8" W x 27" D x 11.5" H



Pyxis MedStation 4000 system typical configuration

Pyxis MedStation 4000 auxiliaries



Pyxis MedStation 4000
7-drawer auxiliary
22.8" W x 27.6" D x 47" H



Pyxis MedStation 4000
half-height column auxiliary
(2 doors)
30" W x 28" D x 43" H



Pyxis MedStation 4000
single column auxiliary
(4 doors)
31" W x 28" D x 79.5" H



Pyxis MedStation 4000
double column auxiliary
(8 doors)
52" W x 28" D x 79.5" H

120V; 60HZ; 140W DATA REQUIRED

Pyxis®



Pyxis MedStation® ES System

Specifications Guide

January 2012
DME: 10000180063 Ver 00

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Pyxis MedStation® ES System Specifications Guide

Changes in equipment, software, or procedures occur periodically; information describing these changes will be included in future editions of the guide.

The information in this document is subject to change and does not represent a commitment on the part of CareFusion to provide additional services or enhancements.

Documentation provided with this product might reference product not present in your facility or not yet available for sale in your area.

Information to User

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Notice

This device complies with Part 18 of the FCC rules.

Canadian Notice (Avis Canadien)

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

Information to User

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canadian Notice (Avis Canadien)

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Authorized European Representative

CareFusion
The Crescent, Jays Close
Basingstoke, Hampshire RG22 4BS
United Kingdom

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About this guide

This guide provides product specifications for CareFusion Pyxis MedStation[®] ES system products.

For additional information or assistance, call the Technical Support Center for Pyxis[®] products (TSC) at 1.800.625.6535 (domestic) or 1.858.617.2000 (international).

Conventions

This guide uses the following conventions:

Text

Cross-references and document titles are formatted in *italics*.

Notice indicators

This document uses the following notices:

NOTE

Notes contain supplementary information or emphasize a point or procedure.

CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. Caution is also used to alert against unsafe practices that could result in unpredictable results or data loss.

Pyxis MedStation ES system specifications

The introduction of the Pyxis MedStation system in 1989 revolutionized the way health care facilities manage their medication distribution process. The Pyxis MedStation 2000 system, the second-generation of the product, is the most widely used point-of-use automated medication dispensing system in the world today. The system brings value to a facility by supporting its efforts to reduce chances of medication errors, enhance quality of care, maintain compliance with regulatory and Joint Commission requirements, control costs, and increase revenue.

The Pyxis MedStation ES system is the newest generation of the Pyxis MedStation system product legacy. It builds upon our industry-leading technology and advances new medication safety, workflow, security, operational, and IT functionality.

The Pyxis MedStation ES system is a cabinet-based storage system used by hospitals and similar institutions to store and safeguard medications and floor stock items. Using a computer in the Pyxis MedStation ES system main cabinet, users can unlock and open drawers in the cabinets and access the contents of the medications stored in the cabinets.

A single configuration of Pyxis MedStation ES cabinets is called a station. A station consists of a main cabinet, or a main cabinet and one or more auxiliary cabinets. A facility can have one Pyxis MedStation ES system or several Pyxis MedStation ES systems connected together in a network.

Using the Pyxis MedStation ES system, a pharmacy can store and track a range of medications and floor-stock items. Depending on your needs, the Pyxis MedStation ES system can manage:

- Narcotics
- Floor stock
- Pro re natas (PRNs) (profile mode recommended)
- First doses (profile mode recommended)
- Some IV solutions and sets
- Up to 95% of all medications (profile mode only)

The actual amount of medication storage depends on your station configurations and other factors. The Pyxis MedStation ES system is flexible and has many configuration options to accommodate customer needs and requirements.



Pyxis MedStation ES main cabinets

Each Pyxis MedStation ES main cabinet includes an electronics drawer (E-drawer) assembly that fastens to the cabinet structural top panel, and a top cover assembly that is hinged to the rear of the E-drawer. The top cover assembly locks to the E-drawer in the closed position and is supported by two gas-filled struts in the open position.

The E-drawer assembly includes the following components:

- Computer motherboard
- Peripheral circuit boards
- Hard drive
- DC power supply
- Backup battery

The top cover assembly includes the following components:

- Monitor/touchscreen assembly
- Keyboard
- Touchpad
- Thermal printer
- BioID fingerprint identification system
- Bar code scanner and mounting bracket

Pyxis MedStation ES main cabinets are fabricated from 18-gauge sheet metal. Each cabinet structure consists of a top panel, bottom panel, right panel, left panel, and middle shelf. A removable, locking rear panel covers the back of the cabinet.

Each Pyxis MedStation ES main cabinet and seven-drawer auxiliary cabinet includes casters that allow the cabinet to be easily moved and levelers for leveling the cabinet.

All cabinets (with the exception of the zero-drawer main cabinet) have two drawer slide brackets for each cabinet drawer position. A drawer release lever at the rear of each bracket allows removal of an entire drawer from the front of the cabinet.




For Pyxis MedStation ES system main cabinet specifications, see *Pyxis MedStation ES main cabinet specifications* on page 3. For information on main cabinet components, see *Pyxis MedStation ES main cabinet components* on page 4.

CAUTION

Always position a Pyxis MedStation ES system two-drawer main cabinet on a surface that is greater in depth than the cabinet itself. Failure to do so may cause the cabinet to tip forward when a drawer is opened.






Pyxis MedStation ES main cabinet specifications

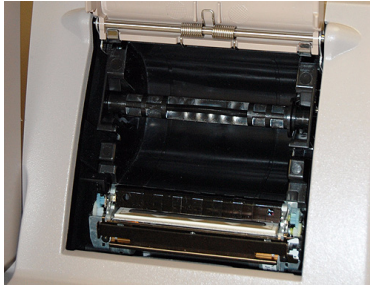


The following table provides specifications for Pyxis MedStation ES main cabinets.

Graphic	Equipment	Imperial dimensions	Metric dimensions	BTUs	Steady power (Watts)	Peak power (Watts)
	Six-drawer	23" (W) 27" (D) 55" (H)	58.4 cm (W) 68.6 cm (D) 139.7 cm (H)	409	80	120
	Two-drawer	23" (W) 27" (D) 28" (H)	58.4 cm (W) 68.6 cm (D) 71.1 cm (H)	409	80	120
	Zero-drawer (connected to auxiliary cabinets)	23" (W) 27" (D) 16" (H)	58.4 cm (W) 68.6 cm (D) 40.6 cm (H)	273	65	80

Pyxis MedStation ES main cabinet components

The following table provides specifications for Pyxis MedStation ES main cabinet components.

Graphic	Equipment	Description
	E-drawer/top cover	Contains the following system components: <ul style="list-style-type: none"> • Communications cube • Power subsystem, including: <ul style="list-style-type: none"> • Power module • Battery pack • Bidirectional converter • 2.5”(6.35 cm), 250 GB SATA hard drive • All-in-one • Keyboard • Touchpad • BioID • Thermal printer • Barcode scanner
	All-in-one	Contains the following system components: <ul style="list-style-type: none"> • Aeon® motherboard with Intel® D510 1.66 GHz CPU • NEC 14.75” (37.47 cm) high-reliability LCD • Gunze high-resolution, projected capacitance touchscreen • Wireless modules, including: <ul style="list-style-type: none"> • Wi-Fi—802.11 b/g • Bluetooth®—802.11.15.1
	Keyboard	Standard PC keyboard with full-travel, reduced footprint. Complete alphabet with numeric and control keys, and a user-selectable 10-key keypad. The keyboard is covered with a keyboard protector to prevent fluid from leaking into the keyboard.
	Touchpad	Solid-state mutual capacitance sensing touchpad
	BioID fingerprint identification system	500 dpi Lumidigm® multispectral fingerprint scanner

Graphic	Equipment	Description
	Thermal printer	Built-in, high speed thermal printer, resolution of 200 dpi, includes easy access door.
	Thermal printer paper	Thermal paper, 3.14 inches (80 mm) wide by 121 feet (36.9 m) long.
	Barcode scanner	Omni-directional 1D/2D LED (non-laser) scanner with digital camera. Hands-free bracket design adds convenience to the scanning process.

Pyxis MedStation ES auxiliary cabinets

Seven-drawer cabinet

Pyxis MedStation ES system-seven-drawer auxiliary cabinets are fabricated from 18-gauge sheet metal. Each cabinet structure consists of a top panel, bottom panel, right panel, left panel, and middle shelf. A removable, locking rear panel covers the back of the cabinet. Each seven-drawer auxiliary cabinet includes a plastic top cover that fastens to the cabinet structural top panel.

All seven-drawer auxiliary cabinets have two drawer slide brackets for each cabinet drawer position. A drawer release lever at the rear of each bracket allows removal of an entire drawer from the front of the cabinet. The cabinet locking rear panel must be removed to access these release levers.

Each Pyxis MedStation ES system seven-drawer auxiliary cabinet includes casters that allow the cabinet to be easily moved and levelers for leveling the cabinet on an uneven floor. For Pyxis MedStation ES system seven-drawer auxiliary cabinet specifications, see *Seven-drawer auxiliary cabinet* on page 7.

Double-column eight-door and single-column four-door cabinets

Pyxis MedStation ES system eight-door and four-door tower auxiliary cabinets are fabricated primarily from 18-gauge sheet metal. The cabinets have four or eight doors respectively that are fabricated primarily from clear acrylic. Cabinets with solid, 16-gauge steel doors are also available.

Cabinet door latches are unlocked using the Pyxis MedStation ES system application. Adjacent pairs of doors at the top and bottom halves of the cabinets can be coupled together, with each set of coupled doors functioning as one Pyxis MedStation ES system device. Each door secures a cabinet storage shelf area with configurable wire shelves. A manual door latch release is located under a locking top grill at the top front of each cabinet.

The top of each cabinet houses an AC power panel with a cabinet light switch. The interior of each cabinet is illuminated by a fluorescent bulb that provides light through diffusing panels inside the cabinet. The light is accessible through a center back panel on each cabinet.

Each of these auxiliary cabinets includes casters, which allow the cabinet to be moved, and levelers for leveling the cabinet on an uneven floor. Lower the levelers to keep the cabinet from moving.

For Pyxis MedStation ES system eight-door and four-door auxiliary cabinet specifications, see *Double-column, single-column, and half-height tower auxiliary cabinets* on page 8.

Half-height tower cabinet

Each Pyxis MedStation ES system half-height tower auxiliary cabinet is fabricated primarily from 18-gauge sheet metal. Each cabinet has two doors fabricated primarily from clear acrylic. Cabinets with solid, 16-gauge steel doors are also available.

The door latches are unlocked by using the Pyxis MedStation ES system application. The doors secure cabinet storage shelf areas with configurable wire shelves. A manual door latch release is located under a locking grill at the top left side of the cabinet.


Each of these auxiliary cabinets includes casters, which allow the cabinet to be moved, and levelers for leveling the cabinet. Lower the levelers to keep the cabinet from moving.

For Pyxis MedStation ES system half-height tower cabinet specifications, see *Double-column, single-column, and half-height tower auxiliary cabinets* on page 8.

Pyxis MedStation ES system auxiliary cabinet specifications

Seven-drawer auxiliary cabinet

The following table provides specifications for Pyxis MedStation ES system seven-drawer auxiliary cabinets.

Graphic	Equipment	Imperial dimensions	Metric dimensions	BTUs	Steady power (Watts)	Peak power (Watts)
	Seven-drawer	23" (W) 27" (D) 47" (H)	58.4 cm (W) 68.6 cm (D) 119.4 cm (H)	N/A	N/A	N/A

Double-column, single-column, and half-height tower auxiliary cabinets

The following table provides specifications for Pyxis MedStation ES system double-column, single-column, and half-height tower auxiliary cabinets.

Graphic	Equipment	Imperial dimensions	Metric dimensions	BTUs	Steady power (Watts)	Peak power (Watts)
	Double-column, eight-door	52" (W) 28" (D) 80" (H)	132.1 cm (W) 71 cm (D) 203.2 cm (H)	222	65	65
	Single-column, four-door	31" (W) 28" (D) 80" (H)	78.7 cm (W) 71.0 cm (D) 203.2 cm (H)	222	65	65
	Half-height tower	30" (W) 28" (D) 43" (H)	76.2 cm (W) 71.0 cm (D) 109.2 cm (H)	N/A	N/A	N/A


Additional cabinet components

The following table provides information about additional Pyxis MedStation ES system cabinet components.

Graphic	Equipment	Description
	<p>Locking rear panel</p> <ul style="list-style-type: none"> Main cabinet, six-drawer Main cabinet, two-drawer Auxiliary cabinet, seven-drawer 	<p>Secures access to drawer manual release levers.</p>
	<p>Locking top grill</p> <ul style="list-style-type: none"> Auxiliary cabinet, double-column, eight-door Auxiliary cabinet, single-column, four-door 	<p>Secures access to door manual release lever.</p>
	<p>Locking top grill</p> <ul style="list-style-type: none"> Auxiliary cabinet, half-height tower 	<p>Secures access to door manual release lever.</p>
	<p>Casters and levelers</p> <ul style="list-style-type: none"> Main cabinet, six-drawer Auxiliary cabinet, seven-drawer 	<p>Casters—make cabinet mobile. Levelers—adjust to level cabinet.</p>
	<p>Casters and levelers</p> <ul style="list-style-type: none"> Auxiliary cabinet, double-column, eight-door Auxiliary cabinet, single-column, four-door Auxiliary cabinet, half-height tower 	<p>Casters—make cabinet mobile. Levelers—adjust to level cabinet.</p>
	<p>Levelers</p> <ul style="list-style-type: none"> Main cabinet, two-drawer Main cabinet, zero-drawer 	<p>Adjust to level main unit.</p>

Pyxis MedStation ES system auxiliary cabinet cables

The following table provides specifications for Pyxis MedStation ES system auxiliary cabinet cables.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	PyxiBus bus cables	12 feet 25 feet 50 feet	3.66 meters 7.62 meters 15.24 meters

Pyxis MedStation ES system drawers

Pyxis MedStation ES system main cabinets and drawer auxiliary cabinets use the following five types of drawers.

- Matrix drawer—See *Matrix drawer and Bin Matrix drawer specifications* on page 12.
- Bin Matrix drawer—See *Matrix drawer and Bin Matrix drawer specifications* on page 12.
- MiniDrawer—See *I-6 MiniDrawer specifications* on page 13 and *I-18 MiniDrawer specifications* on page 14.
- Full-Height CUBIE® drawer—See *Full-Height CUBIE drawer specifications* on page 15.
- Half-Height CUBIE drawer—See *Half-Height CUBIE drawer specifications* on page 16.

Both main cabinets and auxiliaries can use all of these drawer types, in any configuration of drawers that is needed by the customer. Each drawer is self-contained and removable.

All drawer types are the same width and depth, and two drawer heights are available: full-height and double-height. The Matrix drawer, MiniDrawer, Full-Height CUBIE drawer, and CUBIE drawer are all full-height drawers that each occupy one drawer slot in a cabinet. Bin Matrix drawers are double-height drawers that occupy two drawer slots in a cabinet. Each CUBIE drawer contains two half-height drawers.

Each type of drawer contains varying numbers of individual medication storage compartments called pockets.

Each drawer is connected to the system PyxiBus, which in turn is connected to the main cabinet computer. The PyxiBus allows the computer to power each drawer and to send and receive data to and from each drawer.

Each type of drawer features one or more emergency release levers on the rear of the drawer. These emergency release levers are accessed by removing the cabinet locking rear panel. All emergency release levers are red in color for easy identification. These levers are used to bypass the Pyxis MedStation ES system application in emergency situations and allow access to medications in the drawers.



NOTE

Maximum depth of a Pyxis MedStation ES cabinet with any drawer pulled completely open is 50 inches (127.0 cm).

Pyxis MedStation ES system drawer specifications







Matrix drawer and Bin Matrix drawer specifications

The following table provides specifications for Pyxis MedStation ES system Matrix drawers and Bin Matrix drawers.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	Matrix drawer	15.2" (W) 4.4" (D) 2.4" (H)	38.6 cm (W) 11.2 cm (D) 52.1 cm (H)
	Bin Matrix drawer	22.8" (W) 25.5" (D) 10.4" (H)	57.9" (W) 64.8" (D) 26.4" (H)

I-6 MiniDrawer specifications






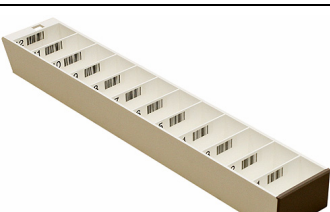
The following table provides specifications for Pyxis MedStation ES system I-6 MiniDrawers.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	MiniDrawer I-6 (1-pocket)	8.0" (W) 15.6" (D) 1.3" (H)	20.3 cm (W) 39.6 cm (D) 3.3 cm (H)
	MiniDrawer I-6 (2-pocket)	8.0" (W) 7.8" (D) 1.3" (H)	20.3 cm (W) 19.8 cm (D) 3.3 cm (H)
	MiniDrawer I-6 (3-pocket)	8.0" (W) 5.1" (D) 1.3" (H)	20.3 cm (W) 13 cm (D) 3.3 cm (H)
	MiniDrawer I-6 (4-pocket)	8.0" (W) 3.9" (D) 1.3" (H)	20.3 cm (W) 9.9 cm (D) 3.3 cm (H)
	MiniDrawer I-6 (6-pocket)	8.0" (W) 2.5" (D) 1.3" (H)	20.3 cm (W) 6.4 cm (D) 3.3 cm (H)
	MiniDrawer I-6 (12-pocket)	8.0" (W) 1.3" (D) 1.3" (H)	20.3 cm (W) 3.3 cm (D) 3.3 cm (H)

Pyxis MedStation ES system specifications

I-18 MiniDrawer specifications

The following table provides specifications for Pyxis MedStation ES system I-18 MiniDrawers.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	MiniDrawer I-18 (1-pocket)	2.5" (W) 15.6" (D) 1.3" (H)	6.4 cm (W) 39.6 cm (D) 3.3cm (H)
	MiniDrawer I-18 (2-pocket)	2.5" (W) 7.8" (D) 1.3" (H)	6.4 cm (W) 19.8 cm (D) 3.3 cm (H)
	MiniDrawer I-18 (3-pocket)	2.5" (W) 5.1" (D) 1.3" (H)	6.4 cm (W) 13.0 cm (D) 3.3 cm (H)
	MiniDrawer I-18 (4-pocket)	2.5" (W) 3.9" (D) 1.3" (H)	6.4 cm (W) 9.9 cm (D) 3.3 cm (H)
	MiniDrawer I-18 (6-pocket)	2.5" (W) 2.5" (D) 1.3" (H)	6.4 cm (W) 6.4 cm (D) 3.3 cm (H)
	MiniDrawer I-18 (12-pocket)	2.5" (W) 1.3" (D) 1.3" (H)	6.4 cm (W) 3.3 cm (D) 3.3 cm (H)




Full-Height CUBIE drawer specifications

The following table provides specifications for each type of Full-Height CUBIE drawer CUBIE pocket.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	Full-Height CUBIE pocket 1X	2.13" (W) 2.99" (D) 4.13" (H)	5.4 cm (W) 7.6 cm (D) 10.5 cm (H)
	Full-Height CUBIE pocket 2X	4.92" (W) 2.72" (D) 4.13" (H)	12.5 cm (W) 6.9 cm (D) 10.5 cm (H)
	Full-Height CUBIE pocket 3X	7.64" (W) 2.72" (D) 4.13" (H)	19.4 cm (W) 6.9 cm (D) 10.5 cm (H)
	Full-Height CUBIE pocket 5X	13.23" (W) 2.68" (D) 4.13" (H)	33.6 cm (W) 6.8 cm (D) 10.5 cm (H)


Half-Height CUBIE drawer specifications

The following table provides specifications for each type of Half-Height CUBIE drawer CUBIE pocket.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	CUBIE Pocket 1x1	2.1" (W) 3.4" (D) 1.5" (H)	5.3 cm (W) 8.6 cm (D) 3.8 cm (H)
	CUBIE Pocket 1x2	4.6" (W) 3.4" (D) 1.5" (H)	11.7 cm (W) 8.6 cm (D) 3.8 cm (H)
	CUBIE Pocket 1x3	7.2" (W) 3.4" (D) 1.5" (H)	18.3 cm (W) 8.6 cm (D) 3.8 cm (H)




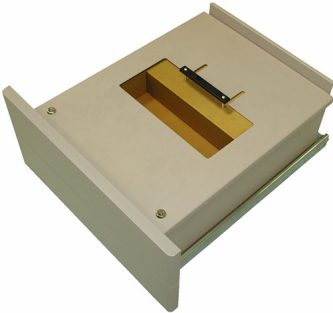
Column auxiliary cabinet door compartment and shelf specifications

The following table provides door compartment and shelf specifications for column auxiliary cabinets and for half-height column auxiliary cabinets.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	Door Compartment	22.0" (W) 25.5" (D) 15.75" (H)	55.9 cm (W) 64.8 cm (D) 40.0 cm (H)
	Shelf	21.3" (W) 24.5" (D)	54.1 cm (W) 62.2 cm (D)

Return bins specifications

The following table provides specifications for Pyxis MedStation ES system return bins.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	External Return Bin, large	15.2" (W) 10.5" (D) 13.8" (H)	38.6 cm (W) 26.7 cm (D) 35.1 cm (H)
	External Return Bin, small	9.0" (W) 6.5" (D) 6.5" (H)	22.9 cm (W) 16.5 cm (D) 16.5 cm (H)
	Internal Return Bin	10.5" (W) 5" (D) 4" (H)	26.7 cm (W) 12.7 cm (D) 10.2 cm (H)
	Full drawer Return Bin	22.8" (W) 25.5" (D) 10.4" (H) Opening Dimensions 11.9" (W) 5.9" (D) 3.0" (H)	26.4 cm (W) 64.8 cm (D) 26.4 cm (H)

Pyxis Remote Manager and Pyxis SMART Remote Manager

For Pyxis Remote Manager and Pyxis SMART Remote Manager specifications, see *Pyxis Remote Manager and Pyxis SMART Remote Manager specifications* on page 19.

Pyxis Remote Manager

Pyxis Remote Manager is an automated medication management system for temperature-sensitive medication. It provides controlled point-of-use access, electronically tracks and records transaction data, and generates reports necessary for inventory management, billing, and regulatory compliance. Pyxis Remote Manager includes an electronic locking latch that can be installed on many commercially available refrigerators or warmers.

Pyxis SMART Remote Manager

The Pyxis Secure Monitor Alarm Record Temperature (SMART) Remote Manager is an automated medication management system for temperature-sensitive medication dispensing and for storage device temperature management. Pyxis SMART Remote Manager provides controlled access, monitors internal storage temperatures of refrigerators or warming devices, provides a warning when temperatures fall outside of user-defined limits, electronically archives transaction and temperature data, and generates reports necessary for regulatory compliance, inventory management, and billing.

Like Pyxis Remote Manager, Pyxis SMART Remote Manager includes an electronic locking latch that can be installed on many commercially available refrigerators or warmers. Pyxis SMART Remote Manager also includes a digital temperature readout on top of the unit.



Pyxis SMART Remote Manager units are available for refrigerator doors that open from either the left or from the right.

Pyxis Remote Manager and Pyxis SMART Remote Manager specifications

The following table provides specifications for Pyxis Remote Manager and Pyxis SMART Remote Manager units.

CAUTION

Do not position a Pyxis Remote Manager or Pyxis SMART Remote Manager refrigerator on top of a Pyxis MedStation ES system auxiliary cabinet. Doing so can exceed the load limit of the cabinet.

Graphic	Equipment	Imperial dimensions (excluding door latch plate)	Metric dimensions (excluding door latch plate)
	Pyxis Remote Manager	4.75" (W) 2.16" (D) 6.76" (H)	12.065 cm (W) 5.486 cm (D) 17.170 cm (H)
	Pyxis SMART Remote Manager	4.75" (W) 2.16" (D) 6.76" (H)	12.065 cm (W) 5.486 cm (D) 17.170 cm (H)





For more detailed information about refrigerators that can be used with Pyxis Remote Manager and Pyxis SMART Remote Manager, see the *CareFusion Guide to selecting compatible refrigerators, Pyxis[®] SMART Remote Manager and Pyxis[®] Remote Manager*.

Pyxis MedStation ES system server specifications

The Pyxis MedStation ES system includes three available console server options:

- Software only (installed on an existing customer server)
- Virtual machine (VM) + software (installed on an existing customer server)
- Turnkey solution (VM + software installed on one of the Dell™ servers shown below)

The following table provides physical specifications for Pyxis MedStation ES system Dell servers.

Graphic	Equipment	Imperial dimensions	Metric dimensions
	Dell PowerEdge™ T310 tower server	8.6" (W) 20.5" (D) 17.3" (H)	21.8 cm (W) 52.1 cm (D) 43.9 cm (H)
	Dell PowerEdge T410 tower server	8.6" (W) 17.5" (D) 24.3" (H)	21.8 cm (W) 44.5 cm (D) 61.7 cm (H)
	Dell PowerEdge R310 rack server	17.1" (W) 24" (D) 1.7" (H)	43.4 cm (W) 61.0 cm (D) 4.3 cm (H)
	Dell PowerEdge R410 rack server	17.1" (W) 24.7" (D) 1.7" (H)	43.4 cm (W) 62.7 cm (D) 4.3 cm (H)

Weight specifications

The following table provides approximate weight specifications for Pyxis MedStation ES system components.

Equipment	Imperial weight	Metric weight
Main cabinet (without drawers, unless specified)		
Six-drawer	165.5 lb	75.1 kg
Four-drawer bin	165.5 lb	75.1 kg
Two-drawer	100.7 lb	45.7 kg
Zero-drawer	48.0 lb	21.8 kg
Auxiliary (without drawers, unless specified)		
Seven-drawer	133 lb	60.3 kg
Two-drawer	100.7 lb	45.7 kg
Double-column eight-door	470.5 lb	213.4 kg
Single-column four-door	314 lb	142.4 kg
Half-height tower auxiliary	260 lb	118.0 kg
Pyxis MedStation ES system consoles		
Dell PowerEdge T310 tower server	51.8 lb	23.5 kg
Dell PowerEdge T410 tower server	62.6 lb	28.4 kg
Dell PowerEdge R310 rack server	35.0 lb	15.9 kg
Dell PowerEdge R410 rack server	35.0 lb	15.9 kg
Drawers/pockets		
Matrix drawer	26 lb	11.6 kg
Matrix drawer (return bin)	30 lb	13.6 kg
CUBIE drawer set (no pockets)	52.2 lb	23.7 kg
CUBIE drawer set (with pockets)	63 lb	28.6 kg
CUBIE Pocket 1x1	2.6 oz	0.07 kg
CUBIE Pocket 1x2	4.7 oz	0.13 kg
CUBIE Pocket 1x3	7.9 oz	0.22 kg
Full-Height CUBIE drawer (no pockets)	38.6 lb	17.5 kg
Full-Height CUBIE pocket 1X	5.4 oz	.15 kg
Full-Height CUBIE pocket 2X	9.0 oz	.26 kg
Full-Height CUBIE pocket 3X	12.2 oz	.35 kg
Full-Height CUBIE pocket 5X	19.7 oz	.56 kg

Pyxis MedStation ES system specifications

Equipment	Imperial weight	Metric weight
MiniDrawer I-6	55 lb	24.9 kg
MiniDrawer I-18	61.3 lb	27.8 kg
Drawers/pockets (continued)		
Bin Matrix drawer	36.4 lb	16.5 kg
Bin Matrix drawer with return bin	45 lb	20.45 kg
Accessories		
Large external return bin	11.6 lb	5.3 kg
Small external return bin	3.5 lb	1.6 kg
Internal return bin	4 lb	1.8 kg

Main cabinet environmental specifications

The following table provides environmental specifications for Pyxis MedStation ES system main cabinets.

Description	Specification
Altitude	2000 m (6,560 ft) maximum
Temperature	5–40 degrees C (41–104 degrees F)
Relative humidity	80% max. for temps up to 31 degrees C (87.8 degrees F), then decreasing linearly to 50% at 40 degrees C (104 degrees F).
Supply Voltage fluctuation	Not to exceed + 10% of nominal Voltage.
Transient over Voltage category	II
Pollution degree	2 (per International Electrotechnical Commission (IEC) 60950 standard)

CPU and power specifications

Description	Equipment	Specification
AC power (line Voltage)	Main (6, 4, 2, 0)	100–240 V, 50–60 Hz
	Column	100–240 V, 50–60 Hz
Load current (Amps)	Main (6, 4, 2, 0)	1 Amp NOM, 3 Amp MAX
	Column	1 Amp NOM, 3 Amp MAX
Circuit breakers	All	One for the system
Heat evolved	Main	2-, 4- and 6-drawer Main approx. 409 BTU/hr.
	Aux	Add 21 BTU for each auxiliary.
	Column	Add 21 BTU for each auxiliary.
Battery	Main	Five-year life span
Console server	Dell PowerEdge T310 tower server	Power supply: Single cabled power supply (375 W) / optional redundant power supply (400W) UPS (Uninterruptible Power supplies): 500 W–2700 W Extended Battery Module (EBM) Network Management Card
	Dell PowerEdge T410 tower server	Power supply: Non-Redundant, 525W (80+) Optional Redundant, 580W (80+ GOLD—80 PLUS energy efficiency rating) Auto Ranging (100V~240V) UPS: 500 W–2700W EBM Network Management Card
	Dell PowerEdge R310 rack server	Power supply: One non-redundant 350W power supply Two hot-pluggable redundant 400W hot-plug power supplies UPS: 1000 W–5600 W 2700 W–5600 W High Efficiency Online EBM Network Management Card
	Dell PowerEdge R410 rack server	Power supply: Non-Redundant, 480W (80+ BRONZE) Optional Redundant, 500W (80+ SILVER) Auto Ranging (100V~240V) UPS: 1000W-5600W 2700W-5600W High Efficiency Online EBM Network Management Card

Cabinet security features

Main cabinets, seven-drawer auxiliary cabinets

Keyed rear panel locks

The cabinet's removable rear panel is secured to the cabinet with two tubular keyed locks that are keyed differently. These locks are located on the top left and right sides of the rear panel. Customers retain control of the keys to these locks at all times, and CareFusion field personnel are prohibited from having these keys in their possession.

The bottom of the rear panel is retained with two sheet metal tabs that insert into holes in the bottom of the cabinet. If the rear panel is pried off of the cabinet, substantial visible structural damage will be evident.

Cabinet security anchor cable

A one-inch hole located at the bottom rear of each cabinet allows the attachment of a cabinet security anchor cable that prevents removal of the entire cabinet.

Additional security features

If the locked cabinet rear panel is removed and a drawer is removed by manually pivoting the drawer latch arm, a speaker in the Pyxis MedStation ES system E-drawer will sound and alarm, and an illegal access message will be logged in the system for the drawer. This message contains the drawer number, and the date and time of access.

If a Pyxis MedStation ES system main cabinet is unplugged from its wall power outlet, the station will go into backup power mode and continue running on the 12-Volt backup battery in the main cabinet E-drawer. A message is logged into the system indicating that power was lost at the station at the date and time of the incident. Any unsaved data is saved, and the station then shuts down.

Double-column eight-door and single-column four-door auxiliary cabinets

Each Pyxis MedStation ES system eight-door and four-door tower auxiliary cabinet includes a top grill with two tubular locks that are keyed differently. Customers retain control of the keys to these locks at all times, and CareFusion field personnel are prohibited from having these keys in their possession.

Unlocking and opening the cabinet top grill provides access to the cabinet manual door latch release.

Lock loop systems

In addition to the cabinet keyed locks, lock loop systems provide an additional level of cabinet security by allowing customers to install their own padlocks on cabinets.

The lock loops on newer cabinets include rear panel lock hasps, to which the customer can install padlocks. Lock loop kits are orderable for installing lock hasps on older cabinets.

Recommended lock loop system procedures

CareFusion recommends the following security procedures for lock loop systems installed on Pyxis MedStation ES system cabinets:

1. Install two padlocks per Pyxis MedStation ES system cabinet, if double-lock-and-key requirements exist.
2. Ensure that each padlock is keyed differently and labeled as "Lock A" and "Lock B."
3. Ensure that all "A" and "B" type padlocks, respectively, are keyed the same throughout the customer site.
4. Develop a secure key control system for both standard Pyxis keys and hospital-owned padlock keys.
5. Restrict access to Pyxis keys and padlock keys to hospital employees only.

Seismic anchoring

In California, certain equipment cabinets must be seismically anchored according to California Building Code Section 1632A. Installation of these anchoring devices is the responsibility of the customer and requires the use of power tools and the careful positioning of heavy objects. It is recommended that these installations be accomplished by a licensed contractor or other hospital-approved, qualified individuals. CareFusion Corporation shall not be liable for damage to equipment or personnel during the installation of these devices. For more information, including seismic anchor kit part numbers, see the *CareFusion Seismic Anchor Kits Install Guide*.

The following Pyxis MedStation ES system cabinets require seismic anchoring:

- Six-drawer main cabinet
- Seven-drawer auxiliary cabinet
- Double-column 8-door auxiliary cabinet
- Single-column 4-door auxiliary cabinet
- Console rack

Cleaning

Cleaning station cabinets and components

CAUTION

To prevent damage to electrical components and to prevent the possibility of electric shock, unplug all Pyxis products prior to cleaning. All electronic areas must be completely dry and free of foreign material prior to returning the product to service.

CAUTION

Avoid contamination of medications and supplies stored in the product when cleaning the drawer and door fronts.

Pyxis products are typically cleaned with mild soap and warm water. If cleansers are used on cabinets, wipe off any cleanser residue with a clean, damp cloth. For solutions that are approved for cleaning Pyxis MedStation ES system equipment, refer to the *Pyxis MedStation[®] System Safety Manual*.

Clean system components as follows:

- Cabinet exteriors—clean with a slightly dampened cloth, ensuring that liquids do not seep into any openings or seams.
- Computer keyboards— clean with a soft cloth slightly dampened with mild soap and warm water, and wipe dry.
- Front surface of display or touchscreen—remove any dirt or fingerprints with an alcohol pad and a clean, lint-free cloth.
- Drawer interiors—clean with a slightly damp cloth and wipe dry.
- Third party peripheral equipment—clean system components such as scanners, printers and handheld devices per the manufacturer's instructions.

Avoiding fluids on top of the station

CAUTION

Do not store fluids on top of Pyxis MedStation ES system cabinets.

If something spills on top of a cabinet, clean it up immediately. Do not allow spilled liquids into any cabinet seams or openings.

Welch Allyn CVSM 6000 Series - VHM-25

PRODUCT DETAILS

VHM-25 for Welch Allyn
WA-0011-27

- Variable Height Mount (VHM-25)
- Small profile - space saving design
- 7 - 20 lb / 3.2 - 9.1 kg Weight limit
- Tilt/swivel adjustment
- Smooth continuous surface with minimal seams for easy cleaning
- 12"/30.5 cm Height adjustment
- 14.8"/37.6 cm maximum reach
- 5"/12.7 cm minimum reach when in the flush position

Welch Allyn Adapter Plate
WA-0011-16



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(866) 2 2298 2842 APAC

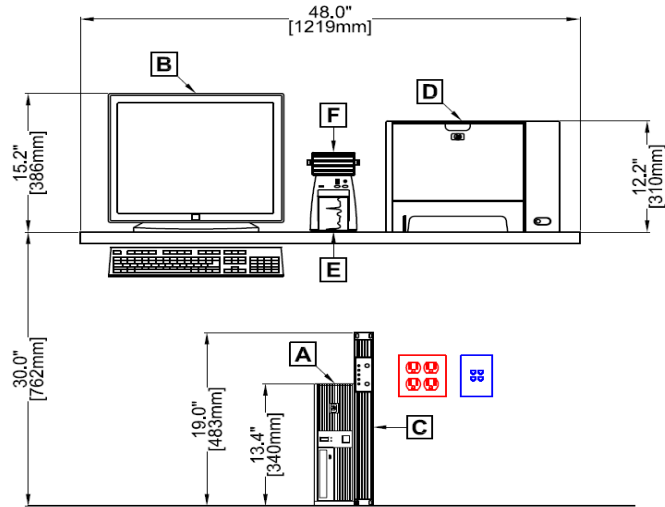
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GCX
Mounting Solutions

Find this product at <http://www.gcx.com/p/10702> Created on July 30, 2014 ©2014 GCX Corporation

Intellivue Information Center with Single LCD Display

(Typical Layout - not site specific)



Typical Central Station Installation

A HP rp5700

Dimensions: 13.4" W x 3.9" H x 15.0" D
 Weight: 19.5 lbs.
 Heat Dissipation: 215 Btu/hr. (max.)
 Power: 5.2A @ 115VAC

C Watchdog UPS (862123)

Dimensions: 17.5" W x 1.75" H x 11.75" D
 Weight: 19 lbs.
 Heat Dissipation: 65 Btu/hr. (Nominal)
 437Btu/hr (Max)
 Power: 5.6A @ 115VAC
 Rackmount option available

E USB Recorder Module (M3176C)

Dimensions: 4.5" W x 6.3" H x 7.0" D
 Weight: — lbs.
 Heat Dissipation: — Btu/hr.
 Power: —

B ELO Touch 19" LCD Display

Dimensions: 15.2" H x 16.9" W x 8.2" D
 Weight: 17.7 lbs.
 Heat Dissipation: N/A
 Power: 0.5A @ 115VAC, 48W typ.

D HP LaserJet P3005n

Dimensions: 16.7" W x 12.2" H x 16.1" D
 Weight: 36.0 lbs.
 Heat Dissipation: — Btu/hr.
 Power: 5.3A @ 117VAC;
 11W Standby, 625W Printing

F Alarm Speaker

Dimensions: 5.0" W x 3.0" H x 2.3" D
 Weight: — lbs.
 Heat Dissipation: — Btu/hr.
 Power: —

Environmental Requirements for Equipment Locations:

Heating, ventilation, air conditioning requirement for general equipment locations must maintain temperature at 62 to 82 degrees Fahrenheit and non-condensing relative humidity at 30 to 60%.



Power Requirements:

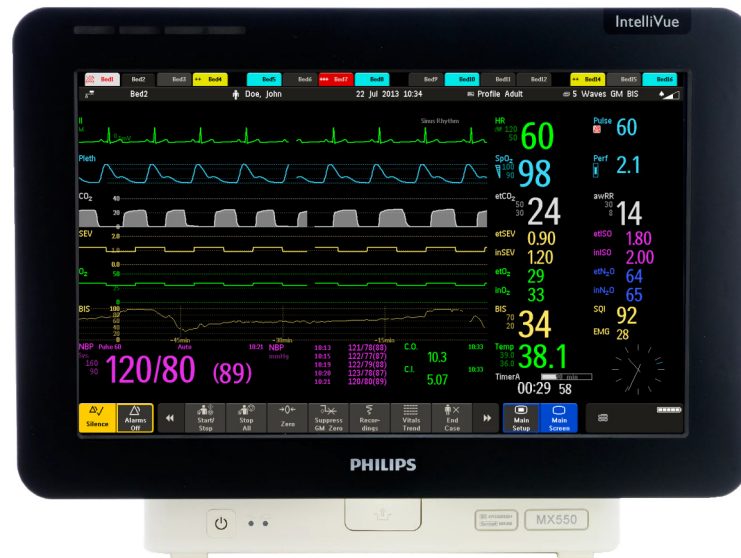
15 Amp dedicated quad outlet within 3' of the rear of unit(s).
 UPS provides power to HP rp5700 and USB recorder only.



Network Requirements:

Ethernet 10/100 base T outlet within only 3' of the rear of the computer(s). All network drops are to be Category 5e or higher certified.

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IntelliVue MX550 Patient Monitor

Philips 866066 Technical Data Sheet

The Philips IntelliVue MX550 patient monitor offers a flexible and modular monitoring solution, designed to suit a broad spectrum of needs. The monitors can be connected to the Philips Multi-Measurement Module (MMS) family with its extensions, plug-in measurement modules and the IntelliVue gas analyzers to extend its functionality with plug-and-play convenience. Dedicated configurations are available for the anesthesia, intensive, cardiac, neonatal and general care environments.

Features

- Intuitive user interface.
- Simple menu hierarchy gives fast access to all basic monitoring tasks.
- Screen layouts are easily adjustable, allowing flexible display of measurement information.
- Previous/Next Screen function provides access to the most recently used screens including the last three modified screens.
- Temperature, height, and weight can be configured either in metric or imperial units. Pressure measurements can be displayed in kPa or mmHg. Gases can be displayed in kPa or mmHg.
- Patient data management with tabular and graphic trends, and high resolution trends to track changes with beat-to-beat resolution.
- Drug, ventilation, hemodynamic, and oxygenation calculations.
- User or case-specific profiles enable rapid case turnover.

PHILIPS

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- Patented automatic alarm limits help clinicians provide care more efficiently.
- Event Surveillance including Neonatal Event Review for automatic detection of patient status deterioration.
- Bed-to-bed overview provides clinicians with an overview of all the patient beds in their care.
- Choice of input devices: Touchscreen, remote control, trackball, mouse, keyboard or barcode reader.
- Capable of functioning in a wireless infrastructure.
- Graphical measurement window shows which measurements are being measured by which device, making it easier to resolve measurement label conflicts.
- Timers application allows you to set timers to notify you when a specific time period has expired.
- The monitor can be configured to automatically adapt the screen brightness to the ambient light conditions. The range within which this adaptation is made is determined by the setting made with the brightness SmartKey.
- Integrated carrying handle.

Indicated Use

The monitor is indicated for use by health care professionals whenever there is a need for monitoring the physiological parameters of patients. The monitor is intended to be used for monitoring and recording of, and to generate alarms for, multiple physiological parameters of adults, pediatrics, and neonates. The monitor is intended for use by trained healthcare professionals in a hospital environment.

The monitor is additionally intended for use in transport situations within hospital environments.

The monitor is only for use on one patient at a time. It is not intended for home use. Not a therapeutic device. The monitor is for prescription use only.

Rx only: U.S. Federal Law restricts this device to sale by or on the order of a physician.

The ECG measurement is intended to be used for diagnostic recording of rhythm and detailed morphology of complex cardiac complexes (according to AAMI EC 11).

ST segment monitoring is intended for use with adult patients only and is not clinically validated for use with neonatal and pediatric patients.

The SSC Sepsis Protocol, in the ProtocolWatch clinical decision support tool, is intended for use with adult patients only.

The Integrated Pulmonary Index (IPI) is intended for use with adult and pediatric (1 to 12 years) patients only. The IPI is an adjunct to and not intended to replace vital sign monitoring.

The derived measurement Pulse Pressure Variation (PPV) is intended for use with sedated patients receiving controlled mechanical ventilation and mainly free from cardiac arrhythmia. The PPV measurement has been validated only for adult patients.

The transcutaneous gas measurement (tcGas) is restricted to neonatal patients only.

The IntelliVue NMT Module is intended to be used as an objective neuromuscular transmission monitor, using accelerometry for measuring the muscle contraction following an electrical stimulation of a peripheral nerve. The NMT Module is intended to be used with adult and pediatric patients.

Modularity

The monitor's functionality can be extended by connecting Philips plug-in modules, the multi-measurement module (MMS) family with extensions, and gas analyzers with plug-and-play convenience.

The monitors are available as standalone or networked solutions.

The monitors' modular design allows new capabilities to be added in the future as monitoring requirements change. This upgradability gives the security of knowing that the monitor can be enhanced and updated as practices and technologies advance, protecting long-term investments.

Main Components

Display

The monitors have a color 15" LCD TFT display with a wide viewing angle, providing high resolution waveform and data presentation.

The MX550 integrates the display and the processing unit into one device. One external display¹ - providing an adaptive duplicate-image of the primary display - can be connected to a built-in DVI-I port.

User Interface

The color Graphical User Interface is designed for fast and intuitive operation, and ensures that clinicians quickly feel at ease using the monitor.

SmartKeys with intuitive icons allow monitoring tasks to be performed quickly and easily, directly on the monitor screen.

Waves and numerics are color-coded.

The MX550 displays up to six waves simultaneously. For 12-lead ECG monitoring it can display 12 real-time ECG waves, with a rhythm strip and all ST values.

Flexible screen layout allows optimal use of the available display space, for example, waves can be overlapped or wave size can adjust dynamically depending on the number of waves configured for the space.

The Basic Help provides on-screen operating help, explaining INOP and alarm messages.

¹ Requires Option J15 - Adaptive Secondary Display.

Touchscreen Operation

The MX550 monitor is supplied as standard with a touchscreen display with a resistive surface.

Remote Control

The IntelliVue Remote Control 865244 provides direct access to five hardkeys, a navigation knob and a numeric keypad which can also be used for alphanumeric entry. The hardkeys include “Silence”, “Alarms Off / Pause Alarms”, “Back Key”, “MainScreen”, and a “SmartKeys” key that displays a block of configurable smart keys. The remote control is connected to the MX550 monitor via USB interface or SRR interface (wireless) and used for remote operation of the monitor.



Input Devices

Supported input devices include USB-compatible off-the-shelf computer accessories such as mouse, keyboard, trackball or barcode reader. All input devices can be used individually or in combination.

Mouse

Any specified USB mouse or trackball may be used for data entry.

Computer Keyboard

A computer keyboard can be connected to the monitor via a USB connection and used for data entry.

Keyboard

If alpha or numeric data entry is required, for example to enter patient demographics, a pop-up keyboard will automatically appear on the screen. If desired a USB-compatible off-the-shelf keyboard can be used instead.

Multi-Measurement Module

The M3001A

Multi-Measurement

Module (MMS) can be

connected without

cables to the rear of the

MX550. The MMS can

also be connected to

the monitor with cables

in order to place it in

patient vicinity. It sends

measurement waves and numerics to the monitor screen and

generates alarms and INOPs. Patient demographic details are stored in



the MMS. Eight hours of patient trends can be transferred to the monitor.

The MMS provides measurement data for Electrocardiogram (ECG)/ Arrhythmia, Respiration, Oxygen Saturation of Arterial Blood (SpO₂), Non-invasive Blood Pressure (NBP), and Invasive Pressure or Temperature. It features 12-lead ECG capability, multi-lead arrhythmia, and 12-lead ST analysis.

X2 Multi-Measurement Module

The M3002A X2

Multi-Measurement

Module can be

connected without

cables to the rear of

the MX550. The X2

can also be connected

to the monitor with

cables in order to

place it in patient

vicinity. It sends

measurement waves

and numerics to the

monitor screen and

generates alarms and INOPs. Up to 24 hours of patient trends are

stored in the X2, as well as patient demographic details. Eight hours of patient trends can be transferred to the host monitor.

The X2 provides measurement data for Electrocardiogram (ECG)/ Arrhythmia, Respiration, Oxygen Saturation of Arterial Blood (SpO₂),

CO₂, Non-Invasive Blood Pressure (NBP), and Invasive Pressure or

Temperature. It features diagnostic 12-lead ECG capability, multi-lead

arrhythmia, and 12-lead ST analysis. The X2 can also be used as a

stand-alone monitor.



IntelliVue X2 Multi-Measurement Module

MMS Extensions

An MMS Extension can be slotted onto an X2 or Multi-Measurement Module to add:

- an additional Invasive Pressure and Temperature Measurement, a third Invasive Pressure, or Temperature Measurement (one at a time) and optionally a Cardiac Output/Continuous Cardiac Output measurement (M3012A), or
- an additional Invasive Pressure Measurement, a third Invasive Pressure or Temperature Measurement (one at a time), an integrated mainstream or sidestream CO₂ measurement and optionally a Cardiac Output/Continuous Cardiac Output measurement (M3014A), or
- an additional Invasive Pressure or Temperature measurement (one at a time) and a Microstream CO₂¹ measurement (M3015A), or

¹ Microstream is a registered trademark of Oridion Systems Ltd.

- a dual Invasive Pressure and Temperature measurement and a Microstream CO₂ measurement (M3015B).

Integrated Module Slots

The monitors have three integrated module slots for use with the plug-in modules.

Plug-In Modules

Individual plug-in measurement modules are available to measure:

- M1006B Invasive Blood Pressure
- M1011A Intravascular Oxygen Saturation Module (SO₂)
- M1012A Cardiac Output/Continuous Cardiac Output
- M1014A Spirometry
- M1020B SpO₂
- M1027A Electroencephalograph (EEG)
- M1029A Temperature
- 865383 NeuroMuscular Transmission (NMT)

Additional plug-in modules available are:

- M1116B/C Thermal Array Recorder
- 865115 EC10 IntelliBridge

Supported Device Interfaces are:

- IntelliBridge (Module or I/O Board)
- RS-232 Data Export
- G1/G5 device

IntelliVue Gas Analyzers

Versatile IntelliVue G1 and G5 gas analyzers measure the five most commonly used anesthetic gases, as well as N₂O and CO₂. They all provide inspiration and expiration values for display on Philips IntelliVue patient monitors and the values required for MAC calculation in the IntelliVue Patient Monitors. The IntelliVue G1 gas analyzer measures the single agent chosen by the clinician. The IntelliVue G5 features automatic agent identification and mixed-agent measurement capability. Advanced O₂ technology based on paramagnetic measurements is optional with the G1 and included as standard with the G5. The TcG10¹ measures the transcutaneous O₂ and CO₂ partial pressure in neonates, pediatrics and adults.

Mounting

The standard mounting options enable flexible, space saving placement of the monitors for an ergonomic work space.

Applications for Specific Care Settings

Anesthesia Features

- The **IntelliVue G1** and **G5** measure the five most commonly used anesthetic gases, as well as N₂O and CO₂.

¹ May not be available in all countries

- The **IntelliBridge EC10 Module** provides external device interface capability to external devices at the bedside which have a serial RS-232 and/or LAN output.
- The **EEG** module determines coma prognosis and extent of cerebral insult. **CSA** information can be either permanently displayed on specially designed screens or viewed in a separate window.
- **Screens** provide flexible viewing of patient information during different procedures or phases of an anesthesia case.
- **Respiratory Loops.** The IntelliVue Patient Monitor can generate three types of respiratory loops and display one real-time loop and up to six stored loops simultaneously. This assists in early detection of patient airway problems (for example, atelectasis, bronchospasm) and ventilator problems (for example, leaks and kinked tubes).
- The **Spirometry Module** provides airway pressure, volume and flow measurements to monitor changes in respiratory status.
- The **NMT Module** together with the NMT Patient Cable offers automatic measurements of muscle response to electrical stimuli delivered via electrodes placed over a peripheral nerve, this enables the evaluation of muscle relaxation of patients under Neuromuscular Block. The strength of the muscle response is measured with an acceleration sensor.

Critical and Cardiac Care Features

- The monitor performs multi-lead **arrhythmia detection** analysis on the patient's ECG waveform at the bedside. It analyzes for ventricular arrhythmias, calculates heart rate, and generates alarms, including asystole, bradycardia, and ventricular fibrillation.
- Up to 12 leads of **ST segment analysis** can be performed on adult patients at the bedside, measuring ST segment elevation and depression and generating alarms and events. The user can trend ST changes, set high and low alarm limits, and set both ST and isoelectric measurement points. ST points can be set either relative to the J-point or directly by selecting a numeric value.
- **QT/QTc interval monitoring** provides the measured QT interval, the calculated heart-rate corrected QTc value and a Δ QTc value, which tracks variation in the QT interval in relation to a baseline value.
- SO₂ and ScvO₂ measurements provide guidance for the treatment of sepsis treatment protocols.
- The **Parameter Histogram** View of the Vital Signs Trend allows the clinician to see, at a glance, the stability of the patient's condition for a selected time period.
- **ST Map** application shows ST changes over time in two multi-axis spider diagrams.
- **12-lead ECG** data can be measured in diagnostic quality, using either the EASI placement method with five standard electrodes or conventional electrode placement with 10 electrodes.² 12 real-time ECG waveforms can be displayed simultaneously on all IntelliVue models.

- High performance pulse oximetry technologies perform accurately even in cases with low perfusion.
- Choice of Microstream, sidestream and mainstream **CO₂ monitoring** for high quality measurements with intubated and non-intubated patients.
- **Continuous cardiac output** and advanced hemodynamic assessment are provided using the PiCCO™ method without a pulmonary catheter.¹
- **Clinical calculations** enable stored and manually entered data to be used to perform hemodynamic, ventilation and oxygenation calculations. Calculated data is displayed in both indexed and non-indexed format.
- **Spirometry** measurements help to manage ventilator settings and weaning.

Neonatal Monitoring Features

- Transcutaneous gas (**TcGas**) monitoring helps to optimize respiratory therapy in neonates.
- **Dual-Pulse Oximetry** capability allows the clinician to measure pre and post-ductal saturations.
- The Oxygen CardioRespiroGram (**oxyCRG**) screens provide a simultaneous presentation of up to three High-Resolution Trends:
 - beat-to-beat heart rate (btbHR)
 - an oxygenation measurement trend (SpO₂ or tcpO₂)
 - compressed respiration rate.
- This customized display gives clinicians a convenient overview of the neonatal patient's most important vital signs, helping them to identify significant events.
- Continuous oxyCRG recordings can be made at the bedside on the integrated recorder, and reports can be printed on locally or centrally connected printers.
- Dual SpO₂ measurement provides clinical support through comparison and trending of the pulse oximetry values from two distinct patient sites.
- Trended values can also be viewed in the form of a histogram. The SpO₂ histograms can be trend histograms or real-time histograms with 1-second samples.
- Car Seat Assessment Record (CAR). This is a special period of event surveillance for neonates during a car seat test. During the CAR period, a real-time SpO₂ histogram is also generated with 1-second samples.
- Neonatal Event Review (NER), for automatic detection of patient status deterioration. NER is optimized for monitoring neonatal patients. For each event, an episode of four minutes of data sampled

² EASI-derived 12-lead ECGs and their measurements are approximations to conventional 12-lead ECGs. As the 12-lead ECG derived with EASI is not exactly identical to the 12-lead conventional ECG obtained from an electrocardiograph, it should not be used for diagnostic purposes.

¹ PiCCO™ is a trademark of Pulsion Medical Systems AG.

four times a second is stored, to help you keep a record of rapidly-changing condition of neonatal patients. Combi-events correlate apnea events with bradycardia and/or desaturations.

IntelliVue Applications

Advanced Clinical Solutions

Clinicians are continuously drawing mental images from their observations of patients' vital signs. The IntelliVue's clinical decision support applications offer this dynamic "minds eye view" directly on the monitoring screen display.

ProtocolWatch

ProtocolWatch allows clinicians to run clinical protocols that can monitor developments in the patient's condition. The SSC Sepsis Protocol runs on the ProtocolWatch application and is used in screening for severe sepsis and monitoring its treatment.

ST Map

ST Map provides a graphical display that can help clinicians to recognize ST changes and their location in the heart more easily. ST Map collects ST values created from the frontal (limb leads) and horizontal (chest leads) plane into an integrated display. The maps are multi-axis portraits of the patient's ST segments as measured with the ST/AR arrhythmia algorithm.

Advanced Event Surveillance

Events are electronic records of episodes in the patient's condition. They can be used to drive alert notification to assist compliance to any protocol that is being used by the clinician.

Horizon Display

Horizon trends provide clinicians with a graphical visualization tool that allows the end user to detect at a glance the patients' current clinical status. By combining parameters together on the display, the clinician is assisted in their cognitive process of pattern recognition.

Loops

Up to six loops of each type can be stored and compared to detect respiratory changes more easily.

Screen Display Flexibility

Up to 20 different screens can be created per monitor, which means that the clinician has the ability to have a screen created to match a specific clinical scenario on which the data that matters is displayed. This streamlines the information that needs to be processed and interpreted to make the right decision at the right time.

Trends

- A choice of four **standard** trend database configurations is provided, designed to suit specific application areas. Patient data from up to 32 measurement numerics can be sampled every 12 seconds, one minute, or five minutes, and stored for a period ranging from four to 48 hours.
- **Tabular Trends** (Vital Signs) show data for up to 32 measurement numerics in tabular form. Tabular Trends can either be viewed in a separate window or permanently displayed on specially designed screens.
 - Each NBP measurement generates a column in the Vital Signs trend table. The values for the other measurements are added to provide a complete vital signs set for the NBP measurement time.
- With **Graphic Trends**, up to three rows of measurement trends can be displayed in graphic form, each combining up to three measurements. Graphical Trends can either be viewed in a separate window or permanently displayed on specially designed screens.
- **Screen Trends** permanently display trend data for periodic and aperiodic parameters in graphical format on special screens. The displayed time period can be set to 30 min, 1 h, 2 h or 4 h.
- **High Resolution Trends** allow the user to track fast-changing measurement trends with beat-to-beat resolution (four samples/second). The number of High Resolution Trends available for display depends on the wave option purchased.
- **Horizon Trends** show the deviation from a stored baseline.
- Trended values can be viewed in the form of a histogram. The SpO₂ histograms can be **Trend Histograms** with 1-second samples.
- Navigation arrows provide easy access to the stored trends. Trend data can be documented on a locally or remotely connected printer.
- With **Event Surveillance**, changes in patients' condition are automatically detected and an electronic record of data called an Episode is stored. The Episode can store:
 - 15 seconds of high-resolution wave trace,
 - four minutes of data sampled four times a second, or
 - 20 minutes of data sampled every 12 seconds.

Event triggers can use the preset alarm limits or they can be user-defined. With user-defined triggers, event episodes are stored even when alarms are paused. A Manual Event SmartKey enables manual episode storage.

Event Annotation allows immediate or retrospective annotation of events using a user-defined list of event markers such as “ventilated”. Events can be stored in a database for retrospective review, and episode data including graphic event reviews can be documented on a local or central printer. In addition, episode data without graphic elements can be documented on the integrated recorder¹. Events are also marked on the Event Line of an Information Center.

¹ Integrated recorder is optional, see: “Hardware Options”.

The **Basic Event Surveillance** package includes one Event Group plus the OxyCRG Group. Up to 50 event episodes can be stored over a 24 hour-period.

The **Advanced Event Surveillance** package offers increased storage capability, enabling the monitor to store data from up to 100 events over a 48-hour period. Up to six user-defined Event Groups can be configured, each made up of up to four measurements. All six groups can be active at the same time. Advanced user-configurable trigger mechanisms allow the clinician to define event triggers combining information from up to four measurements. Either alarm limits or user-defined thresholds or deviations can be configured as event triggers. The user can set event notifications in order to be notified when an event is detected.

Transport Features

- The monitors' portable design means they can be used for in-hospital transport.
- The monitors can operate using battery² power for 2 to 2.5 hours, depending on the monitor configuration, to let you safely and easily monitor patients during procedures or in-hospital transfer.
- The transition from bedside monitoring to transport is smooth and easy, with no need to disconnect patient cables or adjust any measurement or monitor settings.
- The monitor's network capability means that it is ready for use as an integrated part of the hospital system.
- Specially-designed mounting solutions let you quickly disconnect the monitor for transport and reconnect to the mount after transport.

Patient Transfers

- The Universal Admit, Discharge, and Transfer (ADT) feature means that all ADT information is shared between the networked monitor and the Philips IntelliVue Information Center (PIIC/PIIC iX). Information need only be entered once.
- Patients can be transferred by disconnecting the MMS or X2 from a monitor, and then reconnecting it at a new monitor. Patient demographics are stored in the MMS and the X2, so they do not have to be re-entered at the new monitor.

Patient Data Documentation

- An extensive range of **Patient Reports** can be printed:
 - Event Review and Episode Reports
 - 12-lead ECG Reports
 - Vital Signs
 - Graphic Trends
 - Cardiac Output Reports
 - Wedge Procedure Reports
 - Calculations Reports

² Battery required, see: “Hardware Options”.

- EEG Report
- Histogram Reports
- Loops Report
- ST Map Reports
- QT Reports
- Alarm Limit Reports
- Drug Calculator Reports
- Real-time Wave Reports
- Oxy CRG Reports

Report templates can be defined in advance, enabling print-outs tailored to each hospital's specific requirements to be started quickly. Reports can be printed on locally or centrally-connected printers, and they can be initiated manually or automatically at user-defined intervals.

Recordings

The M1116B/C plug-in recorder records numerics for all active measurements and up to three wave forms. It can be used for local recording in the Integrated Module slots.

Alarms

The alarm system can be configured to present either the traditional HP/Agilent/Philips alarm sounds or sounds compliant with the IEC 60601-1-8 Standard.

Alarm limits are permanently visible on the main screen. When an alarm limit is exceeded, it is signalled by the monitor in the following ways:

- an alarm tone sounds, graded according to severity.
- an alarm message is shown on the screen, color-coded according to severity.
- the numeric of the alarming measurement flashes on the screen.
- alarm lamps flash for red and yellow alarms and are illuminated for technical INOPs.

The alarm limit review page offers an overview of alarm limit settings and the possibility to modify these settings for all parameters.

A "SmartAlarm Delay" feature helps to reduce the number of pulse oximetry nuisance alarms.¹

If the monitor is connected via a network to a central monitoring station, alarming is simultaneous at the monitor and at the Information Center.

The nurse call relay has active open and closed contacts and a user-definable delay time.

- Alarms are graded and prioritized according to severity:
 - **Red Alarms***** identify a potentially life threatening situation for a patient.
 - **Yellow Alarms**** indicate conditions violating preset vital signs limits.

- **Yellow Alarms*** indicate arrhythmia alarms.
- **Technical Alarms (INOPS)** are triggered by signal quality problems, equipment malfunction or equipment disconnect.
- The Audio off/Pause Alarms function (equivalent to Silence/Suspend with previous monitor generations) allows the user to switch off alarm tones with one touch or click while retaining visual alarm messages.

All alarms can be paused indefinitely or for a period of one, two, three, five, or 10 minutes depending on their configuration.

Alarm strip recordings are available on the M1116B/C Recorder Module or on a centrally-connected recorder.

Patented automatic alarm limits automatically adapt the alarm limits to the patient's currently measured vital signs within a safe margin defined individually for each patient.

Visual and/or audible latching and non-latching alarm handling is available.

Profiles

Profiles are predefined configuration settings for Screens, measurement settings, and monitor properties. Each Profile can be designed for a specific application area and patient category, for example OR adult, or ICU neo-natal. Profiles enable a quick reaction to patient and care location changes: activating a Profile with a particular patient category (Adult, Pediatric or Neonatal) automatically applies suitable alarm and safety limits and saves time usually spent carrying out a complete set-up procedure.

Profiles can be created directly on the monitor or remotely on a personal computer and transferred to the monitor using the Support Tool. A selection of Profiles for common monitoring situations is provided with the monitor.

Networking Capabilities

The monitor can operate as part of a networked system (wired/ wireless) using the Philips IntelliVue Clinical Network interface.

This includes:

- DHCP protocol support (as an alternative to BootP in certain network designs)
- QoS Tagging
- 802.11 WLAN or Smart Hopping Interface (1.4 or 2.4 GHz)

Other Bed Overview Capability

The alarm status of beds in the same Care Group on the hospital network can be permanently displayed on the screen of each monitor in the Care Group. The user can also view measurement data from all other monitors connected to the hospital network. Other Bed information can either be viewed in a separate window or permanently displayed on specially designed screens.

¹ Not available in the U.S.A. and territories relying on FDA Market clearance. The Smart Alarm Delay functionality is currently not available in China or in clinical environments under SFDA control.

Clinical Calculation Set

The clinical calculation set consists of: Hemodynamic, Oxygenation, and Ventilation calculations.

Hemodynamic Calculations:

- Cardiac Index (C.I.)
- Stroke Volume (SV)
- Stroke Index (SI)
- Systemic Vascular Resistance (SVR)
- Systemic Vascular Resistance Index (SVRI)
- Pulmonary Vascular Resistance (PVR)
- Pulmonary Vascular Resistance Index (PVRI)
- Left Cardiac Work (LCW)
- Left Cardiac Work Index (LCWI)
- Left Ventricular Stroke Work (LVSWS)
- Left Ventricular Stroke Work Index (LVSWSI)
- Right Cardiac Work (RCW)
- Right Cardiac Work Index (RCWI)
- Right Ventricular Stroke Work (RVSWS)
- Right Ventricular Stroke Work Index (RVSWSI)
- Extra Vascular Lung Water Index (EVLWI)
- Intrathoracic Blood Volume Index (ITBVI)
- Global End Diastolic Volume Index (GEDVI)

Oxygenation Calculations:

- Arterial Oxygen Content (CaO₂)
- Venous Oxygen Content (CvO₂)
- Arteriovenous Oxygen Content (CavO₂)
- Oxygen Availability (DO₂)
- Oxygen Availability Index (DO₂I)
- Oxygen Consumption (VO₂)
- Oxygen Consumption Index (VO₂I)
- Oxygen Extraction Ratio (O₂ER)
- Alveolar-Arterial Oxygen Difference (AaDO₂)
- Percent Arteriovenous Shunt (Qs/Qt)

Ventilation Calculations:

- Minute Volume (MINVOL)
- Compliance (COMP)
- Dead Space (Vd)
- Dead Space/Tidal Volume Ratio (Vd/TV)
- Alveolar Ventilation (ALVENT)

Drug Calculator

The drug calculator allows you to calculate the fourth value when three of the following values are entered: dose, amount, volume, rate of infusion.

A titration table and drip table can be displayed and printed.

Measurement units can be converted (for example, lbs to kg).

The drug calculator can also be configured to include a list of commonly used drugs using the support tool.

Service Features

- The Support Tool helps technical personnel to:
 - carry out configuration, upgrades and troubleshooting via the network, or on an individual monitor.
 - share configuration settings between monitors.
 - back up the monitor settings.
 - document configuration settings.
- A password-protected Service Mode ensures that only trained staff can access service tests and tasks.
- The Configuration Mode is password-protected and allows trained users to customize the monitor configuration.

Device Connections

The monitor can be connected to:

- External devices via IntelliBridge EC10 Module/EC10 IF Board.
- Gas Analyzers.
- Information Center (for example, M3150B).

Standard Interface Connections

Adaptive Secondary Display

The Adaptive Secondary Display, (Option J15), activates the DVI video interface. The output of this interface mirrors the content of the monitor display. The output supports VESA display timings, allowing off-the-shelf displays to be used with the DVI output.

Network Interface

The network interface provides the system with networking capability via a wired network connection.

Device Interface (USB Interface)

This interface allows connection of USB devices (Mouse, Keyboard, Barcode Scanner, PCL5-supported Printer) to the monitor.

Further Optional Connection Interfaces

Wireless Infrastructure

- Option J35 enables the monitor to function within a WLAN. The WLAN infrastructure is an IEEE 802.11 a/b/g network in the 2.4 GHz or 5 GHz bands.
- Smart Hopping Interface options, J45 (1.4 GHz [USA only]) and J47 (2.4 GHz) enable communication with a Philips IntelliVue Information Center (PIIC) or a Philips IntelliVue Information Center iX (PIIC iX), using the Philips Cellular Telemetry System (CTS), cellular infrastructure.
- The Short-Range Radio option (J46) provides wireless connectivity to the IntelliVue Remote Control.

Additional components are required to complete the system. Please refer to the IntelliVue Clinical Network documentation for further information.

Advanced System Interface

The Advanced System Interface, option J40, supports an isolated RS-232/5 V interface, a basic Nurse Call connector and two additional USB Connectors.

Device Interface (USB Interface)

Option J25 adds a USB port on the right-hand-side of the monitor.

Flexible Nurse Call Interface

Option J30, the Flexible Nurse Call Interface provides a means for alarms generated on the monitor to be signaled on an external device such as a nurse call system, a beeper or a light. It provides three general alarm relays and one power fail alarm. The external device is connected to the alarm relay and alarms are triggered by criteria defined by the user. It has active open and closed contacts and a user-definable delay time.

MIB/RS-232 (2 port) Interface Board

Additional dual MIB/RS-232 I/O boards (Option J13) can be installed. The MIB ports can be independently configured to be used for:

- input for connection to a touchscreen.
- numeric, wave, and alarm data export using a computer interface, to an automated anesthesia record keeper or a personal computer (not available in all countries).
- connection to a gas analyzer.
- Data Out can be configured up to two times for each monitor. Note that only the first MIB/RS-232 port configured to Data Out (that is, the first one to receive a request) provides wave export. A second MIB/RS-232 port configured to Data Out only exports numerics.

IntelliBridge EC10 IF Board

Option J32, the IntelliBridge external device connection implements the physical layer of the ISO/ IEEE 11073-30200 standard. Driver software is available to support connectivity with a wide range of external medical devices. In case the IntelliBridge EC5 ID Module is used to provide device identification, it also acts as a hardware adapter to the device-specific connector.

Monitor Specifications

See the individual Data Sheets for measurement module, X2, MMS extension, and plug-in module specifications.

Safety Specifications

The monitors, together with the Multi-Measurement Module (M3001A), the X2 Multi-Measurement Module (M3002A) and all modules and MMS extensions, comply with the Medical Device Directive 93/42/EEC (CE₀₃₆₆) and with IEC 60601-1:1988 + A1:1991 + A2:1995; EN60601-1:1990 + A1:1993 + A2:1995; UL 60601-1:2003; CAN/CSA C22.2#601.1-M90 + Suppl. No 1-94 + Am.2; IEC 60601-1-1:2000; EN 60601-1-1:2001; IEC 60601-1-2:2001 +A1:2004; EN 60601-1-2:2001 +A1:2006.

All applied parts are Type CF unless otherwise specified. They are protected against damage from defibrillation and electrosurgery. The possibility of hazards arising from software errors was minimized in compliance with ISO/EN 14971 and IEC/EN60601-1-4. This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada.

Physical Specifications

Product	Max Weight ^a	W x H x D ^b
MX550 Monitor	7.0 kg (15.4 lb)	<404 x308 x 184 mm (15.9 x 12.1 x 7.2 in)
M3001A Multi-Measurement Module (MMS)	<650 g (<1.4 lb)	188 x 96.5 x 51.5 mm (7.4 x 3.8 x 2 in)
M3002A Multi-Measurement Module (MMS)	<1.25 kg (<2.8 lb)	188 x 99 x 86 mm (7.4 x 3.9 x 3.4 in)
M3012A Hemodynamic MMS Extension	<550 g (1.2 lb)	<190 x 98 x 40 mm (<7.5 x 4 x 1.6 in)
M3014A Capnography MMS Extension	<500 g (<1.1 lb)	<190 x 98 x 40 mm (<7.5 x 4 x 1.6 in)
M3015A Microstream CO ₂ MMS Extension	<550 g (<1.21 lb)	<190 x 98 x 40 mm (<7.5 x 4 x 1.6 in)
M1006B Invasive Press Module Option #C01:	190 g (6.7 oz) 220 g (7.9 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)
M1029A Temperature Module	215 g (7.6 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)

Product	Max Weight ^a	W x H x D ^b
M1012A Cardiac Output Module	225 g (7.9 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)
M1014A Spirometry Module	250 g (8.8 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)
M1020B SpO ₂ Module	200 g (<8.8 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)
M1011A SO ₂ Module	190 g (7.1 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)
- Optical Module	<200 g (7.1 oz) including 2.9 m cable	50 x 30 x 120 mm (2.0 x 1.2 x 4.7 in)
M1027A Electroencephalograph Module	210 g (7.4 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)
865115 IntelliBridge EC10 Module	190 g (7.0 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)
865114 IntelliBridge EC5 ID-Module	35 g (1.2 oz)	35 x 17 x 57 mm (1.4 x 0.7 x 2. in)
M1116B/C Thermal Array Recorder Module	500 g (1.1 lbs)	72.5 x 103.5 x 115.5 mm (2.85 x 4.1 x 4.5 in)
865244 Remote Control	<250 g (8.8 oz)	53 x 172 x 24 mm (2.1 x 6.7 x 0.9 in)
865383 NMT Module	210 g (7.4 oz)	36 x 103.5 x 110 mm (1.4 x 4.1 x 4.3 in)

a ± 5%
b ± 5%

Environmental Specifications

MX550Monitors		
Item	Condition	Range
Temperature Range	Operating	0 – 40°C (32 – 100°F). When charging battery, or M3002A is mounted on back, or with Smart Hopping Interface
	Storage	0 – 35°C (32 – 95°F) -20 – 60°C (-4 – 140°F)

MX550Monitors		
Item	Condition	Range
Humidity Range	Operating	15% to 95% Relative Humidity (RH) (non condensing)
	Storage	5% – 95% Relative Humidity (RH)
Altitude Range	Operating	-500 – 3000 m (10000 ft)
	Storage	-500 – 4600 m (15000 ft)
Ingress Protection		IP21

Remote Control 865244		
Item	Condition	Range
Temperature Range	Operating	0 – 40°C (32 – 100°F)
	Storage	-20 – 60°C (-4 – 140°F)
Humidity Range	Operating	15% – 95% Relative Humidity (RH) (non condensing)
	Storage	5% – 95% Relative Humidity (RH)
Altitude Range	Operating	-500 – 3000 m (10000 ft)
	Storage	-500 – 4600 m (15000 ft)

Performance Specifications

MX550Performance Specifications			
Power Specifications	Power	<70 W average	
	Consumption	Line Voltage	100 – 240 V
		Current	1.2 – 0.5 A
		Frequency	50/60 Hz
Display 15 inch	WXGA (15:9)	390 mm active matrix color LCD (TFT)	
	Resolution	1280 x 768	
	Refresh rate	59.9 Hz	
	Useful screen	334.1 x 200.5 mm	
	Pixel pitch	0.261 x 0.261	

MX550 Performance Specifications			
Indicators	Alarms Off	red (crossed out alarms symbol) LED	
	Alarms	red/yellow/light blue (cyan) LED	
	On/Standby/Error	green/red LED integrated in power switch	
	External Power	green LED	
	Battery	red-green-yellow LED	
Sounds	<ul style="list-style-type: none"> • Audible feedback for user input • Prompt tone • QRS tone, or SpO₂ modulation tone • 4 different alarm sounds • Remote tone for alarms on other beds in network • Tone for Timer expired 		
	Trends	Resolution	16, 24 or 32 numerics @ 12 seconds, 1 minute, 5 minute resolution.
		Information	Multiple choices of number of numerics, resolution and duration depending on trend option and application area. For example: Neonatal: 24 numerics, 9 hours @ 12 seconds. Intensive care: 32 numerics, 48 hours @ 5 minutes. Anesthesia: 32 numerics, 5 hours @ 12 seconds.
	High Res Trend Waves	Measurements available	HR, SpO ₂ , Resp, tcpO ₂ , Pulse, Perf, tcpO ₂ , CO ₂ , ABP, PAP, CVP, ICP, CPP, CCO, AWP, Anesthetic Agents, Delta SpO ₂ , inO ₂ .
		Resolution	Measurement samples are taken at a resolution of four samples per second.
Update speed		waves are drawn at a speed of 3 cm/minute.	

MX550 Performance Specifications		
Events	Information	trigger condition and time, event classification and associated detailed view of episode data.
	Episode data	configurable, either: 4 minutes of high resolution trend or 20 minutes of numerics trend @ 12 sec resolution or 15 seconds of 4 waves @ 125 samples/sec (Snapshot) including all current numerics, alarms and inops.
	Capacity (max)	25 or 50 events for either 8 or 24 hours.
	Alarm Signal	System delay
	Pause duration	1,2,3 minutes or infinite, depending on configuration.
	Extended alarm pause	5 or 10 minutes
Review Alarms	Information	all alarms / inops, main alarms on /off, alarm silence and time of occurrence.
	Capacity	300 items.
Real Time Clock	Range	from: January 1, 1997, 00:00 to: December 31, 2080, 23:59.
	Accuracy	better than 4 seconds per day
	Hold Time	infinite if powered by AC; otherwise at least 48 hours (typical: >72 hours).
Buffered Memory	Hold Time	If powered by AC: infinite. Without power: at least 48 hours.
	Contents	Active settings, trends, patient data, realtime reports, events, review alarms.

865244 Remote Control Performance Specifications

Power (when not connected to the USB interface of the monitor) Two AA primary cells

Interface Specifications

MX550 Interface Specifications

Network	Standard	10BASE-T and 100Base-TX (IEEE 802.3), auto-negotiation, full and half-duplex
	Connector	RJ45 (8 pin)
	Isolation	basic insulation (reference voltage: 250 V; test voltage: 1500 V)
USB Interface	Standard	USB 2.0 high-speed
	Connector	USB series “Standard A” receptacle
	Power	Low power port 4.4 V min., max. load for all ports together 500 mA
	Isolation	none
Video Interface^a	Connector	DVI-I (digital and analog, single link).
	Digital video signals	single link TMDS
	Analog video signals	0.7 V _{pp} @75Ω
	HSYNC/VSYNC signals	TTL
Dual MIB/RS-232 Interface^b	Standard	IEEE 11073 30200
	Connector	RJ45 (eight pin)
	Mode	BCC (Rx/D/TxD cross over) or DCC (Rx/D/TxD straight through).
	Power	5 V ±5%, 100 mA (max.)
	Isolation	basic insulation (reference voltage: 250 V, test voltage: 1500 V)

MX550 Interface Specifications

Flexible Nurse Call Interface^b	Connector	20 pin MDR (Mini D-Ribbon), active open and closed contacts.
	Contact	<= 100 mA, <= 24 V DC
	Isolation	basic insulation (reference voltage: 250 V; test voltage: 1500 V)
	Delay	< (Configured Latency +0.5 sec)
IntelliBridge EC10 IF Board	Connector	Modular Jack 8P8C
	Power	5 V 5% @ 0 – 100 mA ^c
	Isolation	double insulation (reference voltage: 250 V; test voltage: 4000 V)
	Connectivity	RS-232/LAN
Smart Hopping IF 1.4 GHz (USA only)	Type	Internal WMTS Adapter
	Technology	compatible with Philips Cellular Telemetry System (CTS), cellular infrastructure.
	Frequency Band	WMTS, 1395 – 1400 MHz and 1427 – 1432 MHz
Smart Hopping IF 2.4 GHz	Type	Internal ISM Adapter
	Technology	compatible with Philips Cellular Telemetry System (CTS), cellular infrastructure.
	Frequency Band	2.4 GHz ISM

MX550 Interface Specifications		
802.11 Wireless IF (Wireless Network Adapter)	Type	Internal Wireless Adapter
	Technology	IEEE 802.11a/b/g
	Frequency Band	2.4 GHz and 5 GHz Band
	Modulation technique	DSSS (CCK, DQPSK, DBPSK), OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
	Effective radiated power	max. 16 dBm (40 mW)
Short-Range Radio Interface	Type	Internal SRR interface
	Technology	IEEE 802.15.4
	Frequency band	2.4 GHz ISM (2.400 – 2.483 GHz)
	Modulation technique	DSSS (O -QPSK)
	Effective radiated power	max. 0 dBm (1 mW)
Measurement Server Link (MSL)	Connectors	MSL out (Proprietary)
	Voltage	48 V ±10 %
	Power	12 W
	Power Sync.	5 V CMOS Level, 78.125 kHz (typical)
	LAN signals	IEEE 802.3 10-Base-T compliant
	Serial signals	RS-422 compliant
ECG Sync Output/Analog ECG Output		
General	Connector	(1/4 in stereo phone jack with tip, ring, sleeve)
	Isolation	none
	Short circuit current	<13 mA
Analog ECG Output (ring, tip) (Ring/Channel 2 is configurable to either Analog ECG Output or Digital Pulse Output)	Gain error	<15%
	Baseline offset	<150 mV
	Error	
	Bandwidth	1 – 100 Hz
	Output voltage swing	±4 V (min.)
	Signal delay	<20 ms
	Signal delay with older versions of the M3001A MMS ^d	<30 ms

MX550 Interface Specifications		
Digital Pulse Output (ring) (Ring/Channel 2 is configurable to either Analog ECG Output or Digital Pulse Output)	Output low voltage level	<0.4 V @ I= -1 mA
	Output high voltage level	>2.4 V @ I= 1 mA
	Pulse Width	100 ms ±10 ms (active high)
	Pulse Rise Time	<1 ms
	Signal delay	<25 ms
	Signal delay with older versions of the M3001A MMS ^d	< 35 ms
Advanced System Interface ^e		
RS-232/5 V	Standard	IEEE 11073 30200
	Connector	RJ45 (eight pin)
	Mode	BCC (Rx/D/TxD cross over)
	Power	5 V ±5%, 100 mA (max.)
	Isolation	basic insulation (reference voltage: 250 V; test voltage: 1500 V)
USB Interface (2 ports)	Standard	USB 2.0 full-speed (Embedded host)
	Connector	USB series “Standard A” receptacle
	Power	Low power port 4.4 V min., max. load for all ports together 500 mA
	Isolation	none
Basic Nurse Call Relay	Connector	Modular Jack 6P6C, active open and closed contact.
	Contact	<=100 mA, <=24 V DC
	Isolation	basic insulation (reference voltage: 250 V, test voltage: 1500 V)
	Delay	<Configured Latency +0.5 sec

a Hardware Standard, option J15 enables video output.

b Optional: See Hardware Options.

c used to supply the IntelliBridge EC5

d (identifiable with the serial number prefix DE227 or DE441 and option string #A01)

e Optional: See Hardware Options.

Battery Specifications

Philips high-power battery M4605A, 10.8 V 6000 mAh Lithium-Ion.

- Weight: 490 g per battery
- Status LEDs indicate charge status of batteries
- Safety: complies with UL1642 (UL recognised)
- Electromagnetic compatibility: complies with the requirements for FCC Type B computing Device, and EN 61000-4-2 and EN 61000-3
- Communication Standard: complies with the SMBus specification v1.1

Battery Operating Time

(New and fully loaded battery):

- With basic monitoring configuration: 2.5 hours (brightness set to optimum, MMS connected, NBP measurement every 15 minutes)
- With extended monitoring configuration: 2 hours (brightness set to optimum, MMS and MMS extension connected, NBP every 15 minutes, Recorder, Pressure, Temperature modules connected)

Battery Charge Time:

- When monitor is switched off: 3 hours
- When monitor is in use: up to 5 hours, depending on monitor configuration.

Ordering Information

Ordering information for the 866066 (MX550) is given here. See the individual Data Sheets for detailed ordering information for the multi-measurement module family, MMS extensions and plug-in modules

Monitor Capability Options¹

Basic Functionality	866066
General Care Software (Default) ^a	H01
Intensive Care Software	H11
Neonatal Care Software	H21
Anesthesia Software	H31
Cardiac Care Software	H41

^a Check availability in your region.

Waveform Capability	866066
4 Real-time Wave Segments (Default)	A04
6 Real-time Wave Segments ^a	A06

^a Check availability in your region.

Measurement Capability	866066
Support two additional Pressures	M06
Support one additional SpO ₂	M20

Application Options²

Clinical Applications	866066
Drug Calculator	C05
Basic Event Surveillance	C06
Advanced Event Surveillance	C07
Parameter Histograms	C09
PV Loops	C21

ProtocolWatch

Clinical Packages	866066
Extended Clinical Applications	CP1
Extended ECG Capabilities	CP2

Protocol Watch	866066
Severe Sepsis Screening	P01
SSC Sepsis Protocol	P02
IntelliVue Guardian EWS	P05

¹ One Hxx option and one Axx option must be chosen.

² availability may depend on choice of Hxx option

Hardware Options

Hardware Add-Ons	866066
Remote Control	E00
Bed Hanger Mount	E21
Quick Release Mount	E22
One Li-ion battery	E24

Interface Options

Wired Interfaces ^a	866066
MIB/RS-232 (2 ports) Interface ^b	J13
Adaptive Secondary Display	J15
USB Interface	J25
Flexible Nurse Call IF	J30
IntelliBridge EC10 IF Board	J32
Advanced System Interface	J40

^a Check availability in your region.

^b Hardware supports multiple boards of this type.

Measurement Options

Wireless Interfaces ^a	866066
802.11 Wireless IF	J35
Smart Hopping IF 1.4 GHz	J45
Short-Range Radio	J46
Smart Hopping IF 2.4 GHz	J47

^a Check availability in your region.

Measurements		Option
Measurement Modules		
Multi-Measurement Module, for Resp, ECG (inc. EASI), NBP, SpO ₂ (FAST SpO ₂ (#A01), Masimo SET (#A03), Nellcor OxiMax Technology (#A04)), and Pressure/Temperature. See the MMS Data Sheet for details.	M3001A	A01, or A03 ^a or A04
Add Press/Temp		C06
Add Press/Temp and Conventional 12 lead ECG		C18
X2 Multi-Measurement Module, for Resp, ECG (inc. EASI), NBP, SpO ₂ (FAST SpO ₂ (#A01), Masimo SET (#A03), Nellcor OxiMax Technology (#A04)), and Pressure/Temperature. See the X2 Data Sheet for details.	M3002A	A01, or A03 ^a or A04
MMS Extensions		
Microstream CO ₂ Extension	M3015A	
Add Press/Temp		C06

Measurements		Option
Microstream CO ₂ Extension (with dual Invasive Pressure and Temperature measurements)	M3015B	C08
Hemodynamic Extension (with Press, Temp, Press/Temp)	M3012A	
Add C.O.		C05
Add C.O./CCO		C10 ^b
Capnography Extension	M3014A	
Add Press, Press/Temp and C.O.		C05
Add Press and Press/Temp		C07
Add Press, Press/Temp and C.O./CCO		C10 ^b

Measurement Modules

See the individual module Data Sheets for details.

Invasive Blood Pressure	M1006B ^c	
SO ₂	M1011A	
Cardiac Output with CCO	M1012A	
Spirometry	M1014A	
SpO ₂ (FAST SpO ₂)	M1020B	A01
SpO ₂ (Nellcor Compatible)	M1020B	A02
SpO ₂ (Masimo SET)	M1020B	A03
EEG	M1027A	
Temperature	M1029A	
Thermal Array Recorder	M1116B	
Thermal Array Recorder	M1116C	
IntelliBridge EC10	865115	
NMT	865383 ^b	

Gas Analyzers

IntelliVue G1	M1013A
IntelliVue G5	M1019A
IntelliVue TcG10 ^d	865298

^a May not be available in all countries.

^b Not available in the U.S.A., Canada or territories relying on FDA Market clearance.

^c Option #C01 provides an analog output signal.

^d May not be available in all countries

Related Products

Related Products	Model Number
Input Devices	M8024A
Slimline keyboard with protective cover	M8024A #A01
Mouse; wired	M8024A #B01
Trackball; wired	M8024A #C01
Trackball; wireless	M8024A #C02
Tabletop wired Trackball	M8024A #C03
Remote Control	865244

Related Products	Model Number
Support Tool	M3086A DVD
<ul style="list-style-type: none"> Orderable via InCenter: http://www3.medical.philips.com/resources/hsg/docs/en-us/custom/intellivue_order.asp 	
Accessory	
External Battery Charger	865432
Philips IntelliVue Battery Extension	865297
(provides additional power to a combination of MMS Extension and M3002A IntelliVue X2 Multi-Measurement Module for situations when no mains power is available, for example, during transport).	

Cables

Length	Description	Product/Option
MSL Cable		
0.75 m	Monitor to MMS	M8022A #SC1
2 m	Monitor to MMS	M8022A #SC2
4 m	Monitor to MMS	M8022A #SC4
10 m	Monitor to MMS	M8022A #SC6
MIB/RS-232 Cables		
1.5 m	Serial cable	M8022A #SR2
3.0 m	Serial cable	M8022A #SR3
10.0 m	Serial cable	M8022A #SR6
15.0 m	Serial cable	M8022A #SR7
25.0 m	Serial cable	M8022A #SR9
Touch Cables		
1.5 m	Touch cable	M8022A #TC2
3.0 m	Touch cable	M8022A #TC3
10.0 m	Touch cable	M8022A #TC6
15.0 m	Touch cable	M8022A #TC7
25.0 m	Touch cable	M8022A # TC9
Nurse Call Relay Cable		
3.0 m	standard (backward compatible) nurse paging relay cable ^a	M8022A #NS3
10.0 m	cable	M8022A #NS6
ECG Out Cable		
3.0 m	standard ECG out cable ^b	M8022A #SY3
25 m	ECG Sync Extension cable	M8022A #SY9

^a One end terminated with 6P6C connector; other end w/o connector.
^b Both ends terminated with 1/4 in phone plug.

Mounting Information

For mounting hardware, contact your local Philips sales representative.
 For more information, see <http://www.medical.philips.com/main/>

[products/patient_monitoring/products/mounting_solutions/mounting_solutions_homepage.wpd.](#)

Documentation

All documentation is available in .pdf format on documentation DVD and is shipped with the product. Additionally, a printed copy of the Instructions for Use ships with each monitor.

- Instructions for Use (printed)
- Documentation DVD including:
 - Installation and Service Guide
 - Configuration Guide
 - Quick Guides
 - Application Notes
 - Training Guide
 - Compatibility Matrix

Upgrade Options

Description	Option #
Waves	
Upgrade from 4 to 6 waves ^a	A06
Interfaces	
MIB/RS-232 Interface (2 ports)	J13
Adaptive Secondary Display ^a	J15
USB Interface	J25
Flexible Nurse call Interface	J30
IntelliBridge EC10 IF Board ^a	J32
802.11 Wireless IF	J35
Advanced System Interface	J40
Smart Hopping IF 1.4 GHz ^a	J45
Smart Hopping IF 2.4 GHz ^a	J47
Short-Range Radio ^a	J46
Clinical Applications	
Drug Calculator	C05
Basic event Surveillance	C06
Advanced Event Surveillance	C07
Parameter Histograms	C09
Hardware Add-On	
Independent Display Interface	E42
Protocol Watch	
Severe Sepsis Screening	P01
SSC Sepsis Protocol	P02
Measurement Capability Options	
Support one additional IBP	M20

^a Check availability in your region.

M Series CCT

M Series CCT Specifications

Defibrillator

Waveform: ZOLL Rectilinear Biphasic.

Energy Selection: Selectable at 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 30, 50, 75, 100, 120, 150, 200 joules. (Delivered into 50 ohm load.)

Charge Time: Less than 6 seconds with a new fully charged battery (first 15 charges to 200J.) Depleted batteries will result in a longer defibrillator charge time.

Energy Display: Monitor display indicates both selected and delivered energy.

Synchronized Mode: Synchronizes defibrillator pulse to patient's R-wave. "SYNC" message displayed on monitor. Marker on display and recorder paper identifies R-wave discharge point.

Advisory Function: Single analysis or programmable auto re-analyze x3 with programmable auto energy level selection, screen prompts, and voice prompts.

Charge Controls: Control on apex paddle and on device front panel.

Paddles: External anterior/anterior adult and pediatric. Adult paddles slide off to expose pediatric paddles.

Multi-Function Electrode (MFE) Pads: Specifically designed adult anterior/posterior pre-gelled ZOLL MFE Pads, and Multi-Function stat•padz™ packaged in pairs.

Built-In Defibrillator Tester: Tests defibrillator energy output and continuity of universal cable and paddles; documented on PCMCIA card and strip chart.

Defibrillation Advisory: Evaluates electrode connection and patient ECG to determine if defibrillation is required.

Shockable Rhythms: Ventricular fibrillation with amplitude > 100 μ V and wide complex ventricular tachycardia with rates greater than 150 bpm.

Multi-Function Electrode Impedance Measurement Range: 0-250 ohms.

Display

Screen Type: Color LCD.

Screen Size: 6.5 inches (16.5 cm) diagonally.

Sweep Speed: 25 mm/sec.

Viewing Time: 4 seconds.

Traces: 3.

Information: Heart Rate, Lead/Pads, Alarm On/Off, Advisory Functions and Prompts, Defibrillator Test Function, Error Corrections and Faults, Code Markers, Alarm Selection and Limits, Delivered Energy, SpO₂, Pacer Functions, EtCO₂, NIBP, Invasive Pressures (2), Temperature (2).

ECG Monitoring

Patient Connection: 3-lead ECG cable, 5-lead ECG cable, 12 lead cable, paddles or MFE Pads. Input selection on front panel.

Input Protection: Fully defibrillator protected. Special circuit prevents distortion of ECG by pacer pulse. (Pacer version only.)

Implanted Pacemaker Spike Display: Dedicated circuitry detects most implanted pacemaker spikes and provides standard display marker of spike on ECG trace.

Bandwidth: 0.5-40 Hz (-3 dB) standard/0.05-150 Hz diagnostic.

Lead Selection: Displayed on monitor.

ECG Size: 0.5, 1, 1.5, 2, 3 cm/mV - display on monitor.

Heart Rate: Digital display 0-300 bpm \pm 5%.

Heart Rate Alarm: On/Off displayed on monitor.

User-selectable, tachycardia 60-280 bpm, bradycardia 20-100 bpm.

1 Volt ECG Out: 1.0 volt/cm of deflection on strip chart recorder < 25 ms delay from patient ECG input.

Display Format: Non-fade moving bar display.

SmartAlarms™: Beeper/voice prompts indicate shockable rhythm.

Recorder

Paper: 90 mm (width).

Speed: 25 mm/sec., 6-second delay.

Annotations: Time, date, defib energy, heart rate, pacer output (pacer version only), QRS sync marker, ECG size, lead, alarm, defib test OK/Fail, analyze ECG, analysis halted, noisy ECG, shock advised, no shock advised, ECG too large, ECG too small, and diagnostic bandwidth.

Printing Method: High-resolution, thermal array print head.

Printout Modes: Manual or automatic - user-configurable.

On/Off Control: Front panel and paddle.

Automatic Function: 15-second recording initiated by alarm activation or defibrillator discharge.

PCMCIA Card Slots

Accepts two standard series Type II Flash Cards, 1-16 MB: Fax modem card capability in slot 2.

PCMCIA Card

Continuous recording of ECG, vital sign and device data; episodic recording of NIBP data. Playback on PC equipped with ZOLL Data Control and specified PCMCIA Card reader.

Battery Packs

Type: Rechargeable, sealed lead acid.

Recharge Time: 7.2 hours or less with integral charger.

Operating Time: For a new, fully charged battery pack at 20°C: 60 defibrillator discharges at maximum energy (200 joules); 2.5 hours continuous ECG and SpO₂ monitoring; 2.3 hours of continuous ECG with pacing (60 mA at 80 bpm) and SpO₂ monitoring, or 1.5 hours of continuous ECG with pacing (60 mA at 80 bpm) SpO₂ monitoring, EtCO₂, and IBP monitoring.

Pulse Oximetry

Saturation (% SpO₂) Range: 1%-100%.

Pulse Rate (bpm) Range: 25-240.

Saturation (% SpO₂) Accuracy During No Motion Conditions: Adults - 70%-100% \pm 2 digits, 0%-69% unspecified.

Saturation (% SpO₂) Accuracy During Motion Conditions: Adults - 70%-100% \pm 3 digits, 0%-69% unspecified.

Pulse (bpm) Accuracy During No Motion Conditions: 25 to 240 \pm 3 digits.

Pulse (bpm) Accuracy During Motion Conditions: 25 to 240 \pm 5 digits.

Saturation (% SpO₂) Resolution: 1%.

Pulse Rate (bpm) Resolution: 1 BPM.

Bio-Compatibility: Patient contacting material meets requirements of ISO 10993-1, Biological Evaluation of Medical Device - Part 1, for external devices, intact surfaces and short-term exposure.

Note: The M Series Pulse Oximetry Option is calibrated for functional saturation.

Pacemaker (Option)

Type: VVI demand; asynchronous (fixed rate) when used without ECG leads or in ASYNC pacing mode.

Pulse: Rectilinear, constant current; 40 milliseconds \pm 2ms; amplitude variable 0 to 140 mA \pm 5% or 5 mA, whichever is greater; digitally displayed on the monitor (increments or decrements by a value of 2 mA); rate variable from 30 to 180 ppm \pm 1.5% (increments or decrements by a value of 2 ppm).

Output Protection: Fully defibrillator protected and isolated. Multi-Function Electrode (MFE) Pads: Specifically designed pre-gelled ZOLL stat•padz™, pro-padz™ and pedi-padz™ MFE packaged in pairs.

EtCO₂ (Option)

Sensor Type: Infrared, Mainstream.

Warm-Up Time: Operational in 15 seconds, full specification within 60 seconds.

Step Response Time: Less than 60 ms adult, less than 50 ms neonate.

End Tidal CO₂ (EtCO₂) Range: 0-100 mmHg.

End Tidal CO₂ (EtCO₂) Accuracy: 0-40 mmHg \pm 2 mmHg, 41-70 mmHg \pm 5%, 71-100 mmHg \pm 8%.

End Tidal CO₂ (EtCO₂) Resolution: 1 mmHg.

Respiration Rate (RR) Range: 0-150 respirations per minute.

Respiration Rate (RR) Resolution: 1 respiration/min.

EtCO₂ Alarm Limits: User-selectable/High 5 to 100 mmHg, Low 0 to 95 mmHg/OFF.

Respiration Rate (RR) Alarm Limits: User-selectable, High 5 to 150 respirations per minute, Low 0 to 100 respirations per minute/OFF.

O₂/N₂O Compensation: User-configurable.

Halogenated Agents: Specification allows for halogenated anesthetic agents, which may be present at normal clinical levels. The presence of desflurane in the exhaled breath beyond normal values (5-6%) may positively bias Carbon Dioxide values by up to an additional 2-3 mmHg.

Barometric Pressure Compensation Range: 550-780 mmHg (automatic).

Airway Adapter Deadspace: Adult < 5 cc, Neonatal < .5 cc.

Environmental:

Operating Temperature: 10° to 40°C.

Storage and Shipping Temperature: -10° to 55°C.

Electromagnetic Immunity: (EtCO₂ Option): AAMI DF-2: IEC 1000-4-3, 15 V/m.

NIBP (Option)

Characteristics and Specifications

Patient Population: Adult, Pediatric.

Method: Oscillometric.

Control: Automatic and manual measurements.

Auto Intervals: 2.5, 3-10, 15, 20, 30, 45, 60, 90, 120 min.

STAT Mode: Maximum number of measurements in 5 minutes, not to exceed 10.

Displayed Pressures: Systolic, Diastolic, Mean.

Displayed Units: mmHg, kPa.

Systolic Range: 40 to 260 mmHg.

Diastolic Range: 25 to 200 mmHg.

Mean Range: 30 to 220 mmHg.

Pressure Transducer Accuracy: \pm 3 mmHg.

Redundant Circuit Overpressure Limit: 300 mmHg.

Pulse Rate Range: 40 to 200 bpm.

Typical Measurement Time: 30 seconds.

12-lead ECG and MUSE Interface (Option)

12 Simultaneously Acquired ECG Leads

12-lead ECG Bandwidth: 0.05 to 150 Hz.

Optional Bandwidth: 0.05 to 40 Hz.

Sampling Rate: 500 sps.

A/D Resolution: 18-bits.

ECG Printing Formats Supported: 4x3 (3 rows, 4 columns, 2.5-10 seconds), 4x3 Cabrera, 4x3 Median Complexes, 2x6 fax only (6 rows, 2 columns, 5 seconds).

Two configurable Custom Lead Groups for 3 Lead strip chart reports.

GE Medical Systems 12SL Analysis Algorithm: Interpretive Statements (configurable - ON/OFF), Global ECG Measurements, 12-Lead Measurements Matrix (configurable-ON/OFF).

Fax Transmission: Group 3 Facsimile, 24 Preprogrammed Phone Numbers (each with 20 digits), Manual Dial Option, Pulse/Tone Option, Cellular phone-compatible modem, 11-Digit Alphanumeric Site and Device Identifier.

Patient Demographics: Patient Name, Patient ID (automatically generated or manually entered), Age, Gender.

IBP (Option)

Number of Channels: 2

Transducer Requirements:

Excitation Voltage: 2.5 V dc.

Transducer Output: 5 μ V/V/mmHg.

Input Impedance: minimum 250 ohms.

Output Impedance: maximum 3000 ohms.

Pressure Range: -50 to 300 mmHg.

Offset Range: \pm 200 mmHg.

Accuracy: \pm 2% measurement or \pm 2 mmHg, whichever is greater, not including transducer.

IBP Safety: per EN60601-2-34.

Temperature (Option)

Number of Channels: 2.

Probe Requirement: YSI 400 compatible.

Temperature Measurement Range: 15 to 45°C.

Resolution: 0.1°C, not including sensor.

General

Size: 10.2 in (25.9 cm) high x 10.3 in (26.2 cm) wide x 8.7 in (22.1 cm) deep.

Weight: 17.2 lb. (7.82 kg) with Multi-Function Cable and battery; 19.2 lb. (8.4 kg) with paddles and battery.

Design Standards: Meets or exceeds UL 2601, AAMI DF-39, AAMI DF-2, and IEC 601-2-4.

Patient Safety: All patient connections are electrically isolated.

Environmental: Operating Temperature: 0° to 50°C; Storage and Shipping Temperature: -20° to 60°C; Humidity: 5 to 95% relative humidity, non-condensing; Vibration: Mil Std 810E, Minimum Integrity Test; Shock: IEC 68-2-27, 50g 6ms half sine; Operating Pressure: 594 to 1060 mBar; Material Ingress: IEC 529, IP23; Electromagnetic Compatibility (EMC): CISPR; 11 Class B Radiated and Conducted Emissions; Electromagnetic

Immunity: AAMI DF-2: IEC 801-3 to 20 V/m; Electrostatic Discharge: AAMI DF-2: IEC 1000-4-2; Conducted Susceptibility: IEC 1000-4-4, 1000-4-5, 1000-4-6.

Options: Xtreme Pack™ I Carry Case

Xtreme Pack™ II Durable Rubber Case for added protection.

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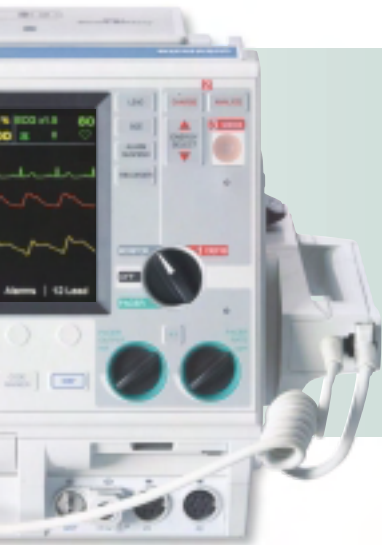
Specifications subject to change without notice.

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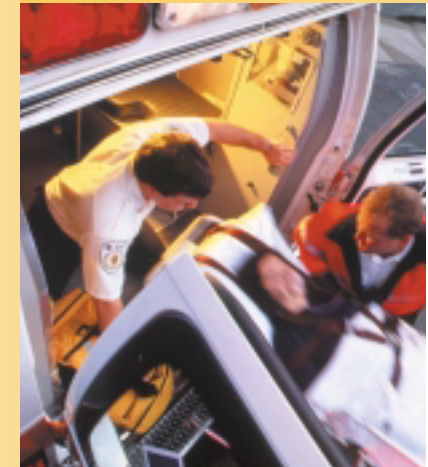
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Invasive and
Non-invasive Vital
Signs Assessment



ZOLL
It's about time.

ZOLL
It's about time.



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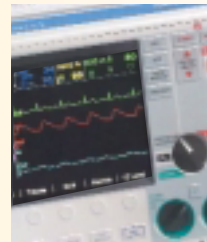
ZOLL Defibrillation: Clinically Superior Resuscitation Therapy

Superior Defibrillation

Only the ZOLL Rectilinear Biphasic™ waveform has proven its clinical superiority for defibrillating VF in high-impedance patients* and cardioverting AF patients.^{1,2} It reduces the myocardium's exposure to high peak current and maintains an optimal waveform shape over a wide range of patient variability—enhancing efficacy while reducing the risks of inappropriate currents.

Superior Pacing

Clinical studies³ have confirmed superior capture rates, lower mean capture thresholds, less muscle artifact and better patient tolerance. ZOLL's constant current, 40-msec pulse overcomes disadvantages inherent in other external pacemakers.



Advisory Capability

The new ZOLL CCT has advisory capabilities to guide less experienced personnel safely and efficiently through defibrillation. ECG displays, optional voice prompts, auto reanalyze, energy levels and many other features can be individually configured to adapt to all skill levels.

References

- Mittal S, Ayati S, Stein KM, Knight BP, Morady F, Schwartzman D, Cavlovich D, Platia EV, Calkins H, Tchou PJ, Miller JM, Wharton JM, Sung RJ, Slotwiner DJ, Markowitz SM, Lerman BB. Comparison of a novel rectilinear biphasic waveform with a damped sine wave monophasic waveform for transthoracic ventricular defibrillation. *Journal of the American College of Cardiology*, 1999; 35:4.
- Mittal S, Ayati S, Stein KM, Schwartzman D, Cavlovich D, Tchou PJ, Markowitz SM, Slotwiner DJ, Scheiner MA, Lerman BB. Transthoracic cardioversion of atrial fibrillation: Comparison of rectilinear biphasic versus damped sine wave monophasic shocks. *Circulation*, 2000; 101:1282-1287.
- Clinical studies on file.

* Superior first shock efficacy (high impedance patients) at a 90% confidence level.

What Makes a Defibrillator Better for Transport?

Superior Care and Portability in One Compact Unit

When you're transporting critical care patients, defibrillation is a capability you need to have on hand. But you also need to keep track of crucial vital signs along the way. The M Series CCT brings together ZOLL's superior biphasic defibrillation, external pacing, complete monitoring, a multiple application printer and a large full-color display—in a single portable unit.

ZOLL XL Battery for Longer Transport Times

The XL Battery delivers the runtime required for long, portable operation. Built-in AC mains power makes transportation from crashcart to bedside—or helicopter to ambulance—easy.



Transport-Ready Design

For transport needs, the M Series CCT is the most efficient, most complete solution. The M Series CCT stays out of the way until you need it. And at just 17 pounds (including the battery), it's smaller and 21% lighter than its nearest competitor.

Easy-to-Read Display

The bright, 6.5" diagonal color display makes monitoring information easy to read at a glance, whether you're rushing down a hallway or working in a helicopter.

M Series Technology and Simplicity

The M Series CCT is the newest member of the ZOLL family of familiar, easy-to-operate defibrillators. With its straightforward controls and ZOLL Uniform Operating System, the M Series CCT reduces staff training and minimizes operator confusion. It is the perfect combination for critical care transport and advanced life support.



Shown with optional bedhook accessory.

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Vital Signs Assessment: Invasive and Non-invasive Parameters

A Full Range of Parameters for a Full Range of Patients

The M Series CCT features a three-channel display for ECG and up to two invasive pressures with ranges covering arterial, pulmonary arterial, central venous or intracranial pressure as well as two temperature channels. In addition, it also provides you all the non-invasive parameter options of the M Series including SpO₂, EtCO₂, NIBP and fully interpretive 12-lead ECG.



Flexible Color Display

The color display shows multiple vital signs in different colors in three different channels—organizing information so you can quickly assess your patient's status while on the move.

Quick, Easy Connections

A VGA output connects the defibrillator to standard displays. It's also compatible with most common IBP transducers and temperature probes.



Ready to Gather and Share Critical Data

The M Series CCT is compatible with ZOLL Data Control for seamless transfer of patient information, including code summary data, via PC card or RS232 upload.

TRANSPORT DEFIBRILLATOR

- Small and Lightweight
- Superior Defibrillation
- Superior Pacing
- Multi-parameter Vitals Monitoring
- Easy-to-Read Display
- Extended Runtime

ZOLL
It's about time.



IntelliVue MX400 Patient Monitor

Philips 866060 Technical Data Sheet

The Philips IntelliVue MX400 patient monitor offers a flexible and modular monitoring solution, designed to suit a broad spectrum of needs. The monitors can be connected to the Philips Multi-Measurement Module (MMS) family with its extensions, and the IntelliVue gas analyzers to extend its functionality with plug-and-play convenience. Dedicated configurations are available for the anesthesia, intensive, cardiac, neonatal and general care environments.

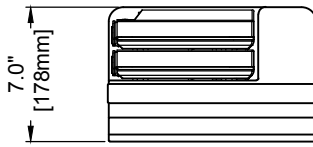
Features

- Intuitive user interface.
- Simple menu hierarchy gives fast access to all basic monitoring tasks.
- Screen layouts are easily adjustable, allowing flexible display of measurement information.
- Previous Screen function provides access to the most recently used screens including the last three modified screens.
- Temperature, height, and weight can be configured either in metric or imperial units. Pressure measurements can be displayed in kPa or mmHg. Gases can be displayed in kPa or mmHg.
- Patient data management with tabular and graphic trends, and high-resolution trends to track changes with beat-to-beat resolution.
- Drug, ventilation, hemodynamic, and oxygenation calculations.
- User or case-specific profiles enable rapid case turnover.

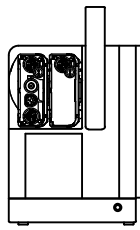
PHILIPS

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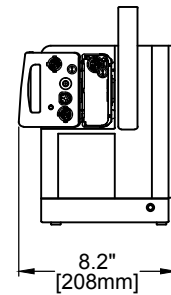
Intellivue Patient Monitor - MX400 (Page 1 of 2)



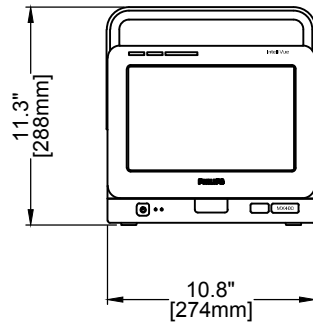
Top



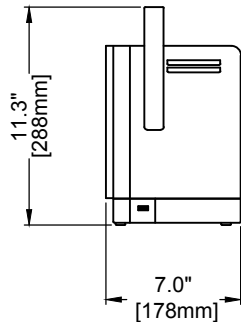
Side w/MMS



Side w/X2



Front



Side w/MMS



Philips Intellivue MX400 Patient Monitor:

Dimensions: 10.8" W x 11.3" H x 7.0" D
 274mm W x 288mm H x 178mm D
 Weight: 11.0 lbs. (5.0 kg) - ±5%.
 Heat Dissipation: 239 Btu/hr.
 Power: < 70 Watts

Environmental Requirements for Equipment Locations:

Heating, ventilation, air conditioning requirement for general equipment locations must maintain temperature at 32 to 104°F, while operating; 32 to 95°F when charging battery or M3002A is mounted on the back of the monitor or with IntelliVue Telemetry Adapter. Non-condensing relative humidity should be maintained at 15 to 95% while operating.



Power Requirements:

15 Amp dedicated duplex outlet within 3' of the rear of unit(s).
 1.8A @ 115 VAC

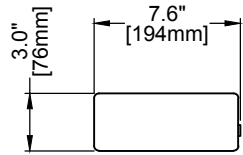


Network Requirements:

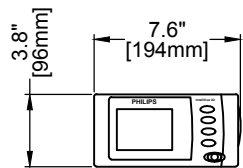
Ethernet 10 base T outlet within 3' of the rear of the unit. All network drops are to be category 5 or higher certified.

IntelliVue Patient Monitor - MX400 (Page 2 of 2)

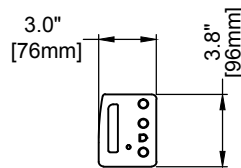
Additional Equipment



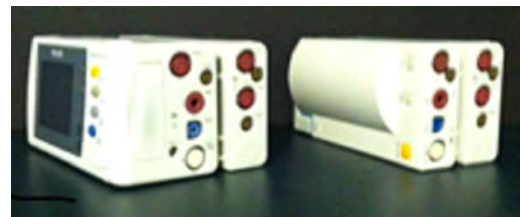
Top



Side



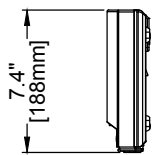
Front



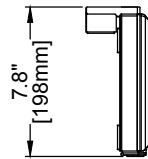
IntelliVue Multi-Measurement Module X2 (M3002A):

Dimensions: 7.6" W x 3.8" H x 3.0" D

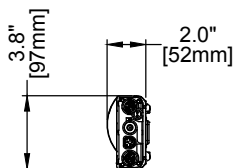
Weight: 2.7 lbs.



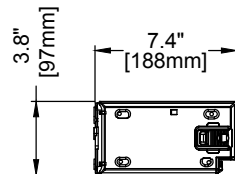
Top



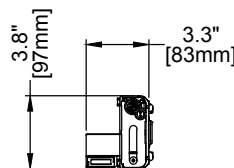
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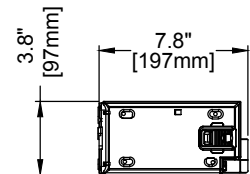
Front



Side



Front



Side

IntelliVue Multi-Measurement Server (M3001A):

Dimensions: 2.0" W x 3.8" H x 7.4" D

Weight: 1.4 lbs.

IntelliVue Server Extension (M3015A/B, M3014A or M3012A):

Dimensions: 3.3" W x 3.8" H x 7.8" D

Weight: 1.4 lbs.

Environmental Requirements for Equipment Locations:

Heating, ventilation, air conditioning requirement for general equipment locations must maintain temperature at 62 to 82 degrees Fahrenheit and non-condensing relative humidity at 30 to 60%.



Power Requirements:

N/A



Network Requirements:

N/A

Required mount adapter if using X2 with optional handle



Device Interface (USB Interface)

This interface allows connection of USB devices (Mouse, Keyboard, Barcode Scanner, Remote Control 865244, PCL5-supported Printer) to the monitor.

Further Optional Connection Interfaces

Wireless Network

Option J35 enables the monitor to function within a wireless infrastructure. The infrastructure is based on an IEEE 802.11 a/b/g network in the 2.4 GHz or 5 GHz bands (ISM). Additional components are required to complete the system. Please refer to the IntelliVue Clinical Network documentation for further information.

Advanced System Interface

The Advanced System Interface, option J40, supports an isolated MIB/RS232 interface, a basic Nurse Call connector and two additional USB Connectors.

Device Interface (USB Interface)

Option J25 adds a USB port on the right-hand-side of the monitor.

Flexible Nurse Call Interface

The Flexible Nurse Call Interface provides a means for alarms generated on the monitor to be signaled on an external device such as a nurse call system, a beeper or a light. It provides three general alarm relays and one power fail alarm. The external device is connected to the alarm relay and alarms are triggered by criteria defined by the user. It has active open and closed contacts and a user-definable delay time.

MIB/RS-232 Interface

Additional MIB/RS-232 I/O boards can be installed. The MIB ports can be independently configured to be used for:

- input for connection to a touchscreen.
- numeric, wave, and alarm data export using a computer interface, to an automated anesthesia record keeper or a personal computer (not available in all countries).
- connection to a gas analyzer.
- Data Out can be configured up to two times for each monitor. Note that only the first MIB/RS-232 port configured to Data Out (that is, the first one to receive a request) provides wave export. A second MIB/RS-232 port configured to Data Out only exports numerics.

Monitor Specifications

For M3001A, X2, and MMS-extension specifications, See the respective Data Sheets.

Safety Specifications

The monitors, together with the Multi-Measurement Module (M3001A), the X2 Multi-Measurement Module (M3002A), and all MMS extensions, comply with the Medical Device Directive 93/42/EEC (CE₀₃₆₆) and with IEC 60601-1:1988 + A1:1991 + A2:1995, EN60601-1:1990 + A1:1993 + A2:1995, UL 60601-1:2003, CAN/CSA C22.2#601.1-M90 + Suppl. No 1-94 + Am.2, IEC 60601-1-1:2000, EN 60601-1-1:2001, IEC 60601-1-2:2001 +A1:2004, EN 60601-1-2:2001 +A1:2006.

All applied parts are Type CF unless otherwise specified. They are protected against damage from defibrillation and electrosurgery. The possibility of hazards arising from software errors was minimized in compliance with ISO/EN 14971 and IEC/EN60601-1-4. This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada.

Physical Specifications

Product	Max. Weight	W x H x D
MX400 Monitor	5 kg ^a (11 lb)	274 x 288 x 178 mm ^b (10.7 x 11.3 x 7 in)
M3001A Multi-Measurement Module (MMS)	<650 g (<1.4 lb)	188 x 96.5 x 51.5 mm (7.4 x 3.8 x 2 in)
M3002A Multi-Measurement Module (MMS)	<1.25 kg (<2.8 lb)	188 x 99 x 86 mm (7.4 x 3.9 x 3.4 in)
M3012A Hemodynamic MMS Extension	<550 g (1.2 lb)	<190 x 98 x 40 mm (<7.5 x 4 x 1.6 in)
M3014A Capnography MMS Extension	<500 g (<1.1 lb)	<190 x 98 x 40 mm (<7.5 x 4 x 1.6 in)
M3015A/B Microstream CO ₂ MMS Extension	<550 g (<1.21 lb)	<190 x 98 x 40 mm (<7.5 x 4 x 1.6 in)
865244 Remote Control	<250 g (8.8 oz)	53 x 172 x 24 mm (2.1 x 6.7 x 0.9 in)

a ± 5%
b ± 5%

Performance Specifications

MX400 Performance Specifications		
Power Specifications	Power	<70 W average
	Consumption	
	Line Voltage	100 – 240 V
	Current	1.2 – 0.5 A
	Frequency	50/60 Hz
WVGA Display 9 inch	230 mm active matrix color LCD (TFT)	
	Resolution	800 x 480
	Useful screen	196.8 x 118.1 mm
	Pixel pitch	0.246 x 0.246
Indicators	Alarms Off	red (crossed out alarms symbol) LED
	Alarms	red/yellow/light blue (cyan) LED
	On/Standby/Error	green/red LED integrated in power switch
	External Power	green LED
	Battery	red-green-yellow LED
Sounds	<ul style="list-style-type: none"> • Audible feedback for user input • Prompt tone • QRS tone, or SpO₂ modulation tone • Four different alarm sounds • Remote tone for alarms on other beds in network • Tone for Timer expired 	
Trends	Resolution	50 numerics with 4h @ 12sec, 24h @ 1min and 48h @ 5min.
High Res Trend Waves	Measurements available	HR, SpO ₂ , Resp, Pulse, Perf, CO ₂ , ABP, PAP, CVP, ICP, CPP, BIS, CCO, Anesthetic Agents, inO ₂
	Resolution	Measurement samples are taken at a resolution of 4 samples per second.
	Update speed	waves are drawn at a speed of 3 cm/minute.

MX400 Performance Specifications

Events	Information	Trigger condition and time, event classification and associated detailed view of episode data.
	Episode data	Configurable, either: 4 minutes of high resolution trend or 20 minutes of numerics trend @ 12 sec resolution or 15 seconds of 4 waves @ 125 samples/sec (Snapshot) including all current numerics, alarms and inops.
	Capacity (max.)	25 or 50 events for either 8 or 24 hours.
Alarm Signal	System delay	less than 3 seconds.
	Pause duration	1, 2, 3 minutes or infinite, depending on configuration.
	Extended alarm pause	5 or 10 minutes
Review Alarms	Information	all alarms / inops, main alarms on/off, alarm silence and time of occurrence.
	Capacity	300 items.
Real Time Clock	Range	from: January 1, 1997, 00:00 to: December 31, 2080, 23:59.
	Accuracy	better than 4 seconds per day
	Hold Time	infinite if powered by AC; otherwise at least 48 hours (typical: >72 hours).

MX400 Performance Specifications

Buffered Memory	Hold Time	if powered by AC: infinite. without power: at least 8 hours.
	Contents	Active settings, trends, patient data, realtime reports, events, review alarms.

Interface Specifications

MX400 Interface Specifications

Network	Standard	10BASE-T (IEEE802.3) and 100Base-TX, auto-negotiation, full and half-duplex(IEEE 802.3af)
	Connector	RJ45 (8 pin)
	Isolation	basic insulation (reference voltage: 250 V; test voltage: 1500 V)
USB Interface	Standard	USB 2.0 high-speed
	Connector	USB series "Standard A" receptacle
	Power	Low power port 4.4 V min., max. load for all ports together 500 mA
	Isolation	none
Dual MIB/RS-232 Interface^a	Standard	IEEE 11073 30200
	Connector	RJ45 (eight pin)
	Mode	Software-controllable BCC (Rx/D/TxD cross over) or DCC (Rx/D/TxD straight through).
	Power	5 V \pm 5%, 100 mA (max.)
	Isolation	basic insulation (reference voltage: 250 V, test voltage: 1500 V)
Flexible Nurse Call Interface^a	Connector	20 pin MDR (Mini D-Ribbon), active open and closed contacts.
	Contact	\leq 100 mA, \leq 24 V DC
	Isolation	basic insulation (reference voltage: 250 V; test voltage: 1500 V)
	Delay	< (Configured Latency +0.5 sec)

MX400 Interface Specifications

802.11 Wireless IF (Wireless Network Adapter)	Type	Internal Wireless Adapter
	Technology	IEEE 802.11a/b/g
	Frequency Band	2.4 GHz and 5 GHz ISM Band
	Modulation technique	DSSS (CCK, DQPSK, DBPSK), OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
	Effective radiated power	max. 16.4 dBm (43.2 mW)
Measurement Server Link (MSL)	Connectors	MSL out (Proprietary)
	Voltage	48 V \pm 10 %
	Power	12 W
	Power Sync.	5 V CMOS Level, 78.125 kHz (typical)
	LAN signals	IEEE 802.3 10-Base-T compliant
	Serial signals	RS-422 compliant

ECG Sync Output/Analog ECG Output

General	Connector	(1/4" stereo phone jack with tip, ring, sleeve)
	Isolation	none
	Short circuit current	<13 mA
Analog ECG Output (ring, tip) (Ring/Channel 2 is configurable to either Analog ECG Output or Digital Pulse Output)	Gain error	<15%
	Baseline offset Error	<150 mV
	Bandwidth	1 – 100 Hz
	Output voltage swing	\pm 4 V (min.)
	Signal delay	<20 ms
	Signal delay with older versions of the M3001A MMS ^b	<30 ms

MX400 Interface Specifications

Digital Pulse Output (ring)	Output low voltage level	<0.4 V @ I = -1 mA
(Ring/Channel 2 is configurable to either Analog ECG Output or Digital Pulse Output)	Output high voltage level	>2.4 V @ I = 1 mA
	Pulse Width	100 ms±10 ms (active high)
	Pulse Rise Time	<1 ms
	Signal delay	<25 ms
	Signal delay with older versions of the M3001A MMS ^b	< 35 ms

Advanced System Interface^c

MIB/RS-232 port	Standard	IEEE 11073 30200
	Connector	RJ45 (eight pin)
	Mode	Software-controllable BCC (Rx/D/TxD cross over)
	Power	5 V ±5%, 100 mA (max.)
	Isolation	basic insulation (reference voltage: 250 V; test voltage: 1500 V)
Basic Nurse Call Relay	Connector	Modular Jack 6P6C, active open and closed contact.
	Contact	<=100 mA, <=24 V DC
	Isolation	basic insulation (reference voltage: 250 V, test voltage: 1500 V)
	Delay	<Configured Latency +0.5 sec
USB Interface (2 ports)	Standard	USB 2.0 full-speed (Embedded host)
	Connector	USB series "Standard A" receptacle
	Power	Low power port 4.4 V min., max. load for all ports together 500 mA
	Isolation	none

a Optional: See Hardware Options.

b (identifiable with the serial number prefix DE227 or DE441 and option string #A01)

c Optional: See Hardware Options.

- Electromagnetic compatibility: complies with the requirements for FCC Type B computing Device, and EN 61000-4-2 and EN 61000-4-3.
- Communication Standard: complies with the SMBus specification v1.1

Battery Operating Time

(New and fully loaded battery):

- With basic monitoring configuration: 5 hours (brightness set to optimum, MMS connected, NBP measurement every 15 minutes).
- With extended monitoring configuration: 3.5 hours (brightness set to optimum, MMS and MMS extension connected, NBP every 15 minutes, Recorder, 1 alarm event every 15 minutes).

Battery Charge Time

- When monitor is switched off: 3 hours.
- When monitor is in use: up to 5 hours, depending on monitor configuration.

Ordering Information

Ordering information for the 866060 (MX400) is given here. See the individual Data Sheets for detailed ordering information for the multi-measurement module family, and MMS extensions.

Battery Specifications

Philips high-power battery M4605A, 10.8 V 6000 mAh Lithium Ion.

- Weight: 490 g.
- Status LEDs indicate charge status of batteries.
- Safety: complies with UL1642 (UL recognised).

Monitor Capability Options¹

Basic Functionality	866060
General Care Software (Default)	H01
Intensive Care Software	H11
Neonatal Care Software	H21
Anesthesia Software	H31
Cardiac Care Software	H41

Waveform Capability	866060
3 Real-time Wave Segments (Default)	A03
4 Real-time Wave Segments	A04
5 Real-time Wave Segments	A05

Application Options²

Measurement Capability	866060
Support one additional Pressure	M05
Cardiac Output	M12

Clinical Packages	866060
Extended Clinical Applications	CP1
Extended ECG Capabilities	CP2

Clinical Applications	866060
Drug Calculator	C05
Basic Event Surveillance	C06
Parameter Histograms	C09
Full Networking	C15

ProtocolWatch

Protocol Watch	866060
Severe Sepsis Screening	P01
IntelliVue Guardian EWS	P05

Hardware Options

Hardware Add-Ons	866060
Remote Control	E00
Integrated Recorder	E05
Bed Hanger Mount	E21
Quick Release Mount	E22
One Li-ion battery	E24

Interface Options

Wired Interfaces	866060
RS-232/MIB Interface ^a	J13
USB Interface ^b	J25
Flexible Nurse Call IF	J30
Advanced System Interface	J40

^a USB on Right-hand side of monitor.
^b Hardware supports two boards of this type.

Wireless Interfaces	866060
802.11 Wireless IF ^a	J35

^a May not be available in all Geographies.

¹ One Hxx option and one Axx must be chosen. If gas analyzers G1, G5 are required, H31 must be ordered.

² availability may depend on choice of Hxx option

Measurement Options

Measurements	Option
Multi Measurement Module	
Multi-Measurement Module, for M3001A	A01, or A03 ^a or A04
Resp, ECG (inc. EASI), NBP, SpO ₂ (FAST SpO ₂ (#A01), Masimo SET (#A03), Nellcor OxiMax Technology (#A04)), and Pressure/Temperature. See the MMS Data Sheet for details.	
Add Press/Temp	C06
Add Press/Temp and Conventional 12 lead ECG	C18
X2 Multi-Measurement Module, for M3002A	A01, or A03 ^a or A04
Resp, ECG (inc. EASI), NBP, SpO ₂ (FAST SpO ₂ (#A01), Masimo SET (#A03), Nellcor OxiMax Technology (#A04)), and Pressure/Temperature. See the X2 Data Sheet for details.	
MMS Extensions	
Microstream CO ₂ Extension M3015A	
Add Press/Temp	C06
Microstream CO ₂ Extension (with dual Invasive Pressure and Temperature measurements)	C08
Hemodynamic Extension M3012A	
(with Press, Temp, Press/Temp)	
Add C.O.	C05
Add C.O./CCO	C10 ^b
Capnography Extension M3014A	
Add Press, Press/Temp and C.O.	C05
Add Press and Press/Temp	C07
Add Press, Press/Temp and C.O./CCO	C10 ^b
Gas Analyzers	
IntelliVue G1 M1013A	
IntelliVue G5 M1019A	

a May not be available in all Geographies.

b Not available in the U.S.A., Canada, or territories relying on FDA Market clearance.

Related Products

Related Products	Model Number
Input Devices	M8024A
Slimline keyboard with protective cover	M8024A #A01
Mouse; wired	M8024A #B01
Trackball; wired	M8024A #C01
Trackball; wireless	M8024A #C02

Related Products	Model Number
Tabletop wired Trackball	M8024A #C03
Remote Control (865244)	Option: #E00
Support Tool	M3086A DVD
– Orderable via InCenter: http://www3.medical.philips.com/resources/hsg/docs/en-us/custom/intellivue_order.asp	
Accessory	
External Battery Charger	865432
Philips IntelliVue Battery Extension	865297
(provides additional power to a combination of MMS Extension and M3002A IntelliVue X2 Multi-Measurement Module for situations when no mains power is available, for example, during transport).	

Cables

Length	Description	Product/Option
MSL Cable		
0.75 m	Monitor to MMS	M8022A #SC1
2 m	Monitor to MMS	M8022A #SC2
4 m	Monitor to MMS	M8022A #SC4
10 m	Monitor to MMS	M8022A #SC6
MIB RS/232 Cables		
1.5 m	Serial cable	M8022A #SR2
3.0 m	Serial cable	M8022A #SR3
10.0 m	Serial cable	M8022A #SR6
15.0 m	Serial cable	M8022A #SR7
25.0 m	Serial cable	M8022A #SR9
Touch Cables		
1.5 m	Touch cable	M8022A #TC2
3.0 m	Touch cable	M8022A #TC3
10.0 m	Touch cable	M8022A #TC6
15.0 m	Touch cable	M8022A #TC7
25.0 m	Touch cable	M8022A #TC9
Nurse Call Relay Cable		
3.0 m	standard (backward compatible) nurse paging relay cable ^a	M8022A #NS3
10.0 m	cable	M8022A #NS6
ECG Out Cable		
3.0 m	standard ECG out cable ^b	M8022A #SY3
25 m	ECG Sync Extension cable	M8022A #SY9

a One end terminated with 6P6C connector; other end w/o connector.

b Both ends terminated with 1/4" phone plug.

PHILIPS*SureSigns*VS4 vital signs
monitor

Act. Don't react.

Expand vital signs monitoring with Early Warning Scoring

Responding to a variety of changing patient conditions for multiple patients at a time means you need to be able to document and escalate effectively, without neglecting your other patients. You need a patient monitor that not only lets you alternate between spot check and frequent measurement of vitals, and capture and check values, but also helps you spot subtle signs of deterioration early.

The SureSigns VS4 simplifies your workflow with an intuitive touch-screen interface, tools like QuickCapture and QuickCheck for documentation, and QuickAlerts (single or multi-parameter modified Early Warning Scoring (EWS)) – to activate your hospital's Rapid Response Team (RRT). It provides you with versatility to support many of your monitoring processes, so you can act decisively to provide targeted care when it can do the most good.



Key advantages

- Easily change between spot check and frequent vital measurements, to help you cope with changing patient conditions
- Intuitive tools to simplify documentation and escalation processes
- Connect with IntelliVue Guardian software (IGS) bringing configurable modified Early Warning Scores to the bedside
- Straightforward interfacing, using standard networking infrastructures and protocol!

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that counts



Premium rollstand includes an easy-to-clean molded basket that can swivel for easy positioning in tight spaces, and dedicated sections for accessories such as a barcode scanner, cleaning wipes, NBP cuffs, extra disposable temperature covers, and the SpO₂ sensor.

Product specifications	OVERALL DIMENSIONS W/ROLLSTAND: 25" X 25" X 50"
Width, height, depth	W: 26 cm (10.2 in), H: 22 cm (8.6 in), D: 14.5 cm (5.7 in)
Weight	3.6 kg (8 lb)
Screen	21.3 cm (8.4 in) SVGA TFT-AM LCD, resistive touch screen, 800 active pixels/line. Resolution: 600 active lines per frame. Viewing angle ±60 degrees
NBP	<ul style="list-style-type: none"> • Oscillometric using stepwise deflation pressure <ul style="list-style-type: none"> – NBP interval choices • Adult measurement range: <ul style="list-style-type: none"> – Systolic: 30 – 270 mmHg (4.0 – 36.0 kPa) – Diastolic: 10 – 245 mmHg (1.3 – 32.7 kPa) – MAP: 20 – 250 mmHg (2.7 – 34.0 kPa) • Pediatric measurement range: <ul style="list-style-type: none"> – Systolic: 30 – 180 mmHg (4.0 – 24.0 kPa) – Diastolic: 10 – 150 mmHg (1.3 – 20.0 kPa) – MAP: 20 – 160 mmHg (2.7 – 21.3 kPa) • Neonatal measurement range: <ul style="list-style-type: none"> – Systolic: 30 – 130 mmHg (4.0 – 17.0 kPa) – Diastolic: 10–100 mmHg (1.3 – 13.3 kPa) – MAP: 20 – 120 mmHg (2.7 – 16.0 kPa) • The NBP measurement has an accuracy over the ranges listed for the values: <ul style="list-style-type: none"> – Maximum standard deviation: 8 mmHg – Maximum mean error: ±5 mmHg • Subsequent cuff inflation (in NBP interval mode only): <ul style="list-style-type: none"> – The subsequent inflation pressure is determined automatically depending on the previous measurement and patient type
CO ₂	Measurement range: 0 mmHg – 150 mmHg Total response time for adults: 3.9 seconds Accuracy: 0 mmHg – 38 mmHg: ±2 mmHg 39 mmHg – 150 mmHg: ±(5% of reading + 0.08% for every 1 mmHg above 38 mmHg) Respiration rate range: 1 – 150 bpm Respiration accuracy: ±1 bpm in the range of 0 – 70 bpm, ±2 bpm in the range of 71 – 120 bpm, ±3 bpm in the range of 121 – 150 bpm.

Also available	To order
SureSigns premium rollstand	989803176601
SureSigns standard rollstand	989803144001
Wall mount	989803144011
2D barcode scanner	989803147821
2D barcode scanner holder	989803191611
HS-1 2D barcode scanner	989803176611
HS-1 barcode scanner roll-stand insert	989803184701
Serial interface adapter	989803159601
Wireless upgrade kit	989803181201
Tympanic temperature upgrade kit	863293
Predictive temperature upgrade kit	863294
Temporal temperature upgrade kit	863342
IntelliVue Guardian Software license	863357
SpO ₂ FAST to Masimo SET upgrade kit	863343

Product specifications (continued)

SpO ₂ Philips FAST-based	Meets EN ISO 9919 standard Measurement range: 0 – 100% Pulse rate measurement range: 30 bpm – 300 bpm Pulse accuracy: within 2% or 1 bpm
SpO ₂ Masimo SET/rainbow	SpO ₂ measurement range: 0 – 100% SpO ₂ accuracy: depends upon patient type and motion/no motion SpHb measurement range: no motion: 0 – 25.0 g/dL SpHb accuracy: ±1 g/dL over range of 8 – 17 g/dL RRa measurement range: 0 breaths per minute to 70 breaths per minute RRa accuracy: 4 breaths per minute to 70 breaths per minute, ±1 breath per minute SpHb and RRa are only supported on adult and pediatric patients (>10 kg)
Temperature Welch Allyn® predictive	Modes: predictive and monitored Probe sites: oral, rectal or axillary Range: 26.7 – 43.3 °C (80.1 – 109.9 °F) in monitoring mode Accuracy: ±0.1 °C (±0.2 °F) in monitoring mode
Temperature Covidien™ tympanic	Equivalency modes: ear (no adjustment), oral, core, and rectal (adjusted from ear)
Monitor mode	Range: 33 – 42.0 °C (91.4 – 107.6 °F) Accuracy (overall range) : ±0.2 °C (±0.4 °F) Measurement response time: ≤ 2 seconds
Temperature Exergen® temporal	Temperature range: 16 – 43 °C (60.8 – 109.4 °F) Accuracy: ±0.1 C or ±0.2 F Response time: approximately 1 second
IntelliVue Guardian software	QuickAlerts Advance Adult only
Battery	Lithium ion: 10.8 – 11.1 V
Data output	HL7 format, via Ethernet port Serial data
Patient type	Adult, pediatric, neonatal

Ordering information

863283	NBP, FAST-based SpO ₂
A01	SpO ₂ and NBP accessories included
A02	No accessories
Temperature:	
T01	Welch Allyn predictive temperature
T02	Covidien tympanic temperature
T03	Exergen temporal temperature
C05	Exergen temporal cap holder
SpO₂:	
M01	Masimo SET SpO ₂
M02	Masimo rainbow SpO ₂ , SpHb
M03	Masimo rainbow SpO ₂ , RRa
C01	Masimo SpO ₂ LNCS cable
C02	Masimo SpO ₂ , SpHb cable
C03	Masimo SpO ₂ , SpHb, RRa cable
C04	Masimo SpO ₂ , SpHb/ LNCS, RRa cable
N01	Adult NBP cuff
Capnography:	
E01	Microstream CO ₂
Other:	
F01	FIPS (US only)
G01	IntelliVue Guardian software
R01	Recorder
W01	802.11 a/b/g Wireless

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¹ SureSigns VS4 has tested compatible with Cisco Compatible Extensions, Version 4. Go to www.cisco.com/go/compatibledisclaimer for complete disclaimer.





Taking vital signs to the next level — the SureSigns VS4.

Get more from vital signs monitoring with the Philips SureSigns VS4. Respond to changing patient conditions by having the versatility to choose between NBP interval mode and spot check mode in the same device. Simplify clinician workflow with an intuitive touch-screen interface and tools like QuickCapture and QuickCheck. Wireless capability and the proactive monitoring tool QuickAlert support your hospital's Rapid Response team. The VS4 is simple to use and works easily with your existing network. It provides you with peace of mind and flexibility — all in a package that's as easy to love as it is to use.



Touch screen – color LED backlit screen.

Internal WiFi / 802.11 a/b/g option.

Tympanic Temperature option.

Predictive Temperature option.

QuickCheck:

- Care giver authentication at the bedside.
- Patient record validation at the bedside.
- Patient record review before export to EHR.

QuickCapture:

- Customize up to 20 observations and assessments entries.

QuickAlerts:

- Supports Hospital Rapid Response Systems.

Additional ease of use enhancements for your IT and network informatics teams and your caregivers.

2D bar-code scanner programmable for multiple ID fields.

Time-sync with hospital or network clock.

Improved battery management, including a clearly visible icon to show unit is plugged in and charging.

Confirmation of exported records easily seen in green.

Clearly identifiable one-touch NBP on/off button.

Stores up to **800 patient records.**

Uses same supplies as all Philips monitors.

PHILIPS
sense and simplicity

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Make the most of patient monitoring

EQUIP# MON06

Philips SpO₂ technology includes a FAST-based SpO₂ algorithm and is compatible with a wide variety of adult, pediatric and neonatal sensors.

AC power input with power cord clip.

Sturdy handle and rugged housing for easy portability.

Lithium ion battery.

USB port for easy software upgrades and data export.

Nurse call output.

LAN/Serial data export in HL7 format.



New premium rollstand includes an easy-to-clean molded basket that can swivel for easy positioning in tight spaces, and dedicated sections for accessories such as bar code scanner, cleaning wipes, NBP cuffs, extra disposable temperature covers and the SPO₂ sensor.

Product Specifications	
Width, Height, Depth	W: 26 cm (10.2"), H: 22 cm (8.6"), D: 14.5 cm (5.7")
Weight	3.1 kg (6.9 lb) – excluding optional recorder
Screen	8.4" SVGA TFT-AM LCD display, 800 active pixels/line. Resolution: 600 active lines per frame. Viewing angle ±60 degrees
NBP	<ul style="list-style-type: none"> Oscillometric using stepwise deflation pressure – NBP interval choices Adult Measurement Range: <ul style="list-style-type: none"> Systolic: 30–270 mmHg (4.0–36.0 kPa) Diastolic: 10–245 mmHg (1.3–32.7 kPa) MAP: 20–225 mmHg (2.7–34.0 kPa) Pediatric Measurement Range: <ul style="list-style-type: none"> Systolic: 30–180 mmHg (4.0–24.0 kPa) Diastolic: 10–150 mmHg (1.3–20.0 kPa) MAP: 20–160 mmHg (2.7–21.3 kPa) Neonatal Measurement Range: <ul style="list-style-type: none"> Systolic: 30–130 mmHg (4.0–17.0 kPa) Diastolic: 10–100 mmHg (1.3–13.3 kPa) MAP: 20–120 mmHg (2.7–16.0 kPa) The NBP measurement has an accuracy over the ranges listed for the values: <ul style="list-style-type: none"> Maximum Standard Deviation: 8 mmHg Maximum Mean Error: ±5 mmHg Subsequent Cuff Inflation (in NBP Interval mode only): <ul style="list-style-type: none"> The subsequent inflation pressure is determined automatically, depending on the previous measurement and patient type
SpO ₂	<ul style="list-style-type: none"> Meets EN ISO 9919 standard Measurement Range: 0–100%, Pulse Rate Measurement range: 30–300 pbm Accuracy: Depends on Sensor
Temperature Welch Allyn Predictive	<ul style="list-style-type: none"> Modes: Predictive and Monitored Probe sites: Oral, Rectal or Axillary Range: 26.7–43.3°C (80–110°F) Accuracy: ±0.1°C (±0.2°F) in monitoring mode
Temperature Covidien Tympanic	<ul style="list-style-type: none"> Tympanic Thermometer - an ear canal thermometer for neonates, newborns, children and adults Probe sites: Oral, Rectal or Axillary Equivalency modes: Ear (no adjustment), Oral (adjusted from ear), Core (adjusted from ear) and Rectal (adjusted from ear) Range: 33°C–42.0°C (91.4°F–107.6°F) Accuracy (overall range) : ±0.2°C (36.7–38.9); Display resolution: 0.1°C or 0.1°F Measurement response time: ≤2 seconds
Battery	<ul style="list-style-type: none"> Lithium ion: 10.8–11.1V (with a "202" form factor) Operating time: 4 hours with NBP every 15 minutes.
Data Output	<ul style="list-style-type: none"> HL7 format, via Ethernet port Serial data
Patient Type	Adult, Pediatric, Neonatal

Also Available	To Order
SureSigns Premium Rollstand	989803176601
SureSigns Standard Rollstand	989803144001
SureSigns Value Rollstand	989803175861
Wall Mount	989803144011
2D Bar Code Reader and Mount	989803147821
SureSigns HS-12D Barcode Kit	989803176611
Serial Interface Adapter	989803159601

Ordering Information	
NBP, SpO ₂	863283
Predictive Temperature	T01
Tympanic Temperature	T02
Recorder	R01
Internal wireless	W01
SPO ₂ & NBP (Accessories included)	A01

Standard Accessories	
Adult NBP Cuff	M4555B
NBP Interconnect Tubing	M1599B
Reusable Clip SpO ₂ Sensor >40 kg (3M)	M1196A
Oral/Axillary Temperature Probe Kit	989803143381
Temperature Probe Covers (One Box)	M4823A
Genius 2 Tympanic Temperature Probe covers (CE mark)	989803179611
Genius 2 Tympanic Temperature Probe covers (no CE mark)	989803179381
Reusable Clip SpO ₂ Sensor >40 kg (2M)	M1196S



SureSigns VS4 has tested compatible with Cisco Compatible Extensions, Version 4. Go to www.cisco.com/go/compatible/disclaimer for complete disclaimer.

Please visit www.philips.com/suresigns for more information.



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IntelliVue MX40

Instructions for Use

Release B.0

PHILIPS

15. Safety Standards & Specifications

This section describes the regulatory standards that the IntelliVue MX40 complies with, along with product and measurement specifications.

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Physical Specifications	15-18
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Regulatory Information

Software Hazard Prevention

Potential hazards arising from errors in the software program have been identified. Mitigations applied to reduce the associated risk of such hazards are included as part of the Risk Management, Clinical Evaluation, and Verification and Validation phases of the product's development.

AC Power Source

The system is not intended for connection to the public mains as defined in CISPR-11.

Industrie Canada Compliance (Canada)

This Class B ISM device complies with Canadian ICES-001.

Cet ISM de la classe B est conforme à la norme NMB-001 du Canada.

Safety Standards

The device complies with the following safety requirements for medical electrical equipment:

- EN 60601-1:1990 + A1:1993 + A2:1995 + A11:1993 + A12:1993 + A13:1996 General Requirements for Safety (with worldwide deviations, including U.S. deviations)
- CSA C22.2 #601.1:1992 Medical Electrical Equipment - General Safety
- UL 60601-1 Medical Electrical Equipment - General Safety
- UL 2054 Standards for Household and Commercial Batteries
- EN 60601-1-1:2006 System Requirements
- EN 60601-1-4:2000 Safety Requirements for Programmable Electronic Medical Systems
- EN 50371:2005 Low Power Electronic and Electronic Apparatus Electromagnetic Exposure
- EN ISO 9919:2005 Requirements for SpO₂ Pulse Oximeters
- EN ISO 10993-1:2003 Biocompatibility
- EN ISO 10993-1:2003 Biocompatibility (for leadwires and pouch)
- EN ISO 9919:2005 Pulse Oximeters

- IEC 60601-1-2:2001 Electromagnetic Compliance
- IEC 60601-1-4:1999 +A1 Requirements for Programmable Electrical Medical Systems
- IEC 60601-1-6:2006 General requirements for basic safety and essential performance - Collateral standard: Usability
- IEC 60601-1-8:2006 General Requirements for Safety for Alarm Systems
- IEC 60601-2-49:2001 Particular Requirements for Safety for Patient Monitoring Equipment
- IEC 60601-2-27:2005 Particular Requirements for Safety for Electrocardiograph Monitoring Equipment
- IEC 62133:2002 Safety Requirements for Portable Sealed Secondary Cells (alkaline, lithium-ion)
- AAMI EC 13:2007 Performance Standard, Cardiac Monitors
- AAMI EC 53:1995 (R) 2001 ECG Cables/Leadwires (excluding 4.2.1)

Intended Use Statement

Intended for monitoring and recording of and to generate alarms for, multiple physiological parameters of adults and pediatrics in a hospital environment and during patient transport inside hospitals. Not intended for home use. Intended for use by health care professionals.

Indications for Use

Indicated for use by health care professionals whenever there is a need for monitoring the physiological parameters of patients. Intended for monitoring and recording of, and to generate alarms for, multiple physiological parameters of adults and pediatrics in hospital environments and during transport inside hospitals.

Intended Uses of MX40

The MX40 is to be used primarily as a traditional telemetry medical device. It connects to the IntelliVue Information Center by way of a wireless network. When the MX40 is connected the IntelliVue Information Center the IntelliVue Information Center provides the primary patient monitoring and alarming function. The MX40 does not automatically provide local monitoring or alarming when connected to the Information Center.

The MX40 can provide time-limited local monitoring when it is not connected to the wireless network.

Unlike a traditional bedside monitor which operates on AC power, the MX40 is powered by battery and cannot provide continuous monitoring.

Authorized EU Representative

Philips Medizin Systeme Deutschland
Hewlett-Packard-Strasse 2
D 71034, Boeblingen
Germany

Patient Population

This device is not for use with infant or neonatal patients.

Clinical judgment must be used to determine when the MX40 should be used on a specific pediatric patient, as it is not possible to assign a precise weight or age to ECG performance.

Use of the device is restricted to one patient at a time.

The components/accessories which come into contact with the patient's skin are in compliance with the relevant requirements of EN ISO 10993-1 for Biocompatibility. The device is not designed for direct contact with the patient's skin. The accompanying pouch is the appropriate means for holding the device.

Rx

Federal Law restricts this device to sale by or on the order of a physician.

Essential Performance

The IntelliVue MX40 provides Essential Performance (EP) under normal operating conditions (includes EMC exposure) only as a complete Medical Electrical System, consisting of the MX40, MPx companion monitor (Optional), IntelliVue CL SpO₂ and NBP Cableless Measurement devices(Optional), IntelliVue Telemetry Network Infrastructure, and the Information Center.

The System achieves its Essential Performance exclusively through alarm generation at the IntelliVue Information Center and locally at the MX40, based on configuration.

The IntelliVue MX40 protects the patient from unacceptable immediate clinical risk by generating specific Physiological Alarms when appropriate. If the system cannot generate Physiological Alarms, then relevant Severe or Hard-Level Technical Alarms (Inops) are created.

Risk Management Considerations

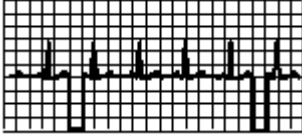
Warning

The MX40 operates exclusively via a wireless network connection, therefore, it should not be used for primary monitoring in applications where momentary loss of the ECG is unacceptable at the Information Center. It sends ECG and optionally pulse oximetry data to the Information Center, where the Information Center displays real-time patient data, provides alarm annunciation, data storage and review applications. The ECG waveform data, alarms and optionally SpO₂ can always be viewed on the MX40 regardless of the connection to the Information Center.

Smart Hopping technology alleviates most of the problems associated with legacy telemetry technologies. Reception problems are less frequent, because Smart Hopping avoids interference and moves to a different access point if the signal strength is too low. The level of radio frequency activity is always fluctuating in the environment. If the level becomes high enough to significantly interfere with transceiver operation, the system responds by moving to another "cleaner" area where there is less activity.

Dropouts

Because the MX40 operates exclusively via a wireless network connection, under certain frequency conditions dropouts can occur. Dropouts result from a weak signal or RF interference, and appear on the waveform when the signal "drops" to the bottom of the channel for a minimum of 200 ms. If dropouts are frequent enough to affect the heart rate count, the "Cannot Analyze ECG" or "Cannot Analyze ST" technical alarm occurs. If there are enough dropouts to cause disassociation/reassociation with the Information Center, events in the Clinical Review application can reflect loss of data for up to 1 minute in the worst case.

Problem	Cause	Remedy
Dropouts 	Low signal strength RF interference	See "Signal Strength" below. See "Radio Frequency Interference" below.

Monitoring Considerations

- Patient should be restricted to the designated coverage area. Monitoring performance will degrade if patients go outside the radius of coverage of the receiving wireless network.
- A patient location strategy is critical to a telemetry system. If a life-threatening event occurs, the clinician must be able to locate the patient quickly. The importance of this increases as the coverage area increases.
- Frequency management is the responsibility of the hospital. Philips Healthcare has no control over the RF environment in the hospital. If interference exists at the operating frequencies of the telemetry equipment, telemetry performance will be affected. Careful selection of frequencies for all wireless devices used within a facility (transceivers, other wireless medical devices, etc.) is important to prevent interference between them.

Caution

IEC/ANSI/AAMI 80001-1:2010

Philips recognizes the importance of a safe and effective network that meets both the business needs of a healthcare facility, IT networking requirements, and the clinical functionality. Philips supports the IEC 80001-1 standard in regards to working as a partner with a healthcare organization in the design, implementation, and management of the Medical IT-Network to properly provision and support not only Philips devices, but all the devices using the network. Applying the principles of risk management to hospital frameworks is highly encouraged.

When operating the MX40 on a Customer Supplied Clinical Network, Philips strongly encourages our customers to perform risk management of their Medical IT-Network infrastructure in accordance with IEC 80001.

If the MX40 experiences loss of network connectivity, technical alerts at the Information Center ("No Signal") and at the MX40 ("No Central Monitor") will occur. The MX40 will also automatically revert to local monitor mode which activates display of patient data on the MX40 – however, when in this state, battery life will be shortened.

Electromagnetic Compatibility

Medical electrical equipment can either generate or receive electromagnetic interference. This product has been evaluated for electromagnetic compatibility (EMC) with the appropriate accessories according to IEC 60601-1-2:2001, the international standard for EMC for medical electrical equipment. This IEC standard has been adopted in the European Union as the European Norm, EN 60601-1-2:2001.

Radio frequency (RF) interference from nearby transmitting devices can degrade performance of the product. Electromagnetic compatibility with surrounding devices should be assessed prior to using the product.

Fixed, portable, and mobile radio frequency communications equipment can also affect the performance of medical equipment. See your service provider for assistance with the minimum recommended separation distance between RF communications equipment and the product.

The cables, sensors/transducers, and other accessories for which compliance is claimed are listed in the Service and User documentation accompanying the product.

Warnings

- The use of accessories, transducers and cables other than those specified in the product service and user documentation can result in increased electromagnetic emissions or decreased immunity of the product.
 - Short-range radio connections are subject to interruption due to interference from other radio sources in the vicinity, including microwaves, bluetooth devices, and DECT phones. Outside the frequency band and 5% above and below, i.e. the exclusion band according to IEC 60601-1-2, the short-range radio connection is immune up to 3V/m in the frequency range from 80MHz to 2.5 GHz. Depending on the strength and duration of the interference, the interruption may occur for an extended period. Any interruption of the signal due to interference, moving out of range, or for other reasons is indicated with a Tele Disconnected INOP message.
 - The product should not be used next to or stacked with other equipment. If you must stack the product, you must check that normal operation is possible in the necessary configuration before the product is used on patients.
-

Reducing Electromagnetic Interference

The MX40 and associated accessories can be susceptible to interference from other RF energy sources and continuous, repetitive, power line bursts. Examples of other sources of RF interference are other medical electrical devices, cellular products, information technology equipment, and radio/television transmission. If interference is encountered, as demonstrated by artifact on the ECG or dramatic variations in physiological parameter measurement values, attempt to locate the source. Assess the following:

- Is the interference due to misplaced or poorly applied electrodes or sensors? If so, re-apply electrodes and sensors correctly according to directions in Chapter 6.
- Is the interference intermittent or constant?
- Does the interference occur only in certain locations?
- Does the interference occur only when in close proximity to certain medical electrical equipment?

Once the source is located, attempt to attenuate the interference by distancing the MX40 from the source as much as possible. If assistance is needed, contact your local service representative.

Restrictions for Use

Artifact on ECG and other physiological waveforms caused by electromagnetic interference should be evaluated by a physician or physician authorized personnel to determine if it will negatively impact patient diagnosis or treatment.

Electromagnetic Compatibility (EMC) Specifications

Take special precautions regarding electromagnetic compatibility (EMC) when using medical electrical equipment. You must operate your monitoring equipment according to the EMC information provided in this book. Portable and mobile radiofrequency (RF) communications equipment can affect medical electrical equipment.

Accessories Compliant with EMC Standards

All accessories listed in the accessories section comply, in combination with the MX40, with the requirements of IEC 60601-1-2:2001 + A1:2004.

Warning

Using accessories other than those specified may result in increased electromagnetic emission or decreased electromagnetic immunity of the monitoring equipment.

Electromagnetic Emissions

Emissions Test	Compliance	Avoiding Electromagnetic Interference
Radio Frequency (RF) emissions	Group 1	TheMX40 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The MX40 is suitable for use in all establishments.
Harmonized emissions	Not Applicable	Device is battery powered only
Voltage fluctuations/Flicker emissions IEC 61000-3-3	Not Applicable	

Electromagnetic Immunity

The MX40 is suitable for use in the specified electromagnetic environment. The user must ensure that it is used in the appropriate environment as described below.

Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial and/or hospital environment

Recommended Separation Distance

Warning

The MX40, equipped with a wireless network interface, intentionally receives RF electromagnetic energy for the purpose of its operation. Therefore, other equipment may cause interference, even if that other equipment complies with CISPR emission requirements.

In the following table, P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).

Portable and mobile RF communications equipment should be used no closer to any part of the MX40, including cables, than the recommended separation distance calculated from the equation appropriate for the frequency of the transmitter.

Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range.

Interference may occur in the vicinity of equipment marked with this

symbol: 

Immunity Test	IEC 60601-1-2 Test Level	Compliance Level	Electromagnetic Environment Guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 VRMS	Recommended separation distance: $d = 1.2\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	Recommended separation distance: 80 MHz to 800 MHz $d = 1.2\sqrt{P}$ 800 MHz to 2.5 GHz $d = 2.3\sqrt{P}$

Electromagnetic Compatibility

Field strengths from fixed transmitters, such as base stations for radio (cellular, cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the monitor is used exceeds the applicable RF compliance level above, the MX40 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the monitor.

These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

The MX40 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the monitor can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment and the monitor as recommended below, according to the maximum output power of the communications equipment.

In the following table, P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).

Frequency of Transmitter	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
Equation	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 2.3\sqrt{P}$
Rated max. output power of transmitter	Separation distance	Separation distance	Separation distance
0.01 W	0.1 m	0.1 m	0.2 m
0.1 W	0.4 m	0.4 m	0.7 m
1 W	1.2 m	1.3 m	2.3 m
10 W	3.8 m	3.8 m	7.3 m
100 W	12.0 m	12.0 m	23.0 m

Electrosurgery Interference/Defibrillation/Electrostatic Discharge

The equipment returns to the previous operating mode within 10 seconds without loss of any stored data. Measurement accuracy may be temporarily decreased while performing defibrillation. This does not affect patient or equipment safety. Do not expose the equipment to x-ray or strong magnetic fields (MRI). The MX40 is not for use during electrosurgery.

Restart Time

After power interruption, an ECG wave will be shown on the display after 30 seconds maximum.

Battery Specifications

Battery Life

The battery life specifications listed below are based on the use of three Duracell MN 1500 batteries. Battery life for other brands may differ.

Telemetry Mode Networked (Display Off)	Battery Life (1.4GHz p/n 865350)	Battery Life (2.4GHz p/n 865351)
ECG Only (only one radio active)	24.9 hours	24.7 hours
ECG/SpO ₂ Continuous (using legacy SpO ₂ cable/sensors. Only one radio active.)	11.2 hours	8.9 hours
ECG/SpO ₂ Manual	In this mode battery life is dependent on the usage rate and will range between the ECG Only battery life and the ECG/SpO ₂ Continuous battery life.	

Monitor Mode Networked (Display On)	Battery Life (1.4GHz p/n 865350)	Battery Life (2.4GHz p/n 865351)
ECG Only (only one radio active)	11 hours	7.7 hours
ECG/SpO ₂ Continuous (using legacy SpO ₂ cable/sensors. Only one radio active.)	5.3 hours	2.9 hours
ECG/SpO ₂ Manual	In this mode battery life is dependent on the usage rate and will range between the ECG Only battery life and the ECG/SpO ₂ Continuous battery life.	

Monitor Mode Non-networked (Display On)	Battery Life (1.4GHz p/n 865350)	Battery Life (2.4GHz p/n 865351)
ECG Only (only one radio active)	6.8 hours	7.3 hours
ECG/SpO ₂ Continuous (using legacy SpO ₂ cable/sensors. Only one radio active.)	4.7 hours	4.6 hours

Monitor Mode Non-networked (Display On)	Battery Life (1.4GHz p/n 865350)	Battery Life (2.4GHz p/n 865351)
ECG/SpO ₂ Manual	In this mode battery life is dependent on the usage rate and will range between the ECG Only battery life and the ECG/SpO ₂ Continuous battery life.	

The battery life specifications listed below are based on the use of the Philips Rechargeable Lithium-ion battery.

Telemetry Mode Networked (Display Off)	Battery Life (1.4GHz p/n 865350)	Battery Life (2.4GHz p/n 865351)	Battery Life (WLAN p/n 865352)
ECG Only (only one radio active)	26.1 hours	25.1	25 hours
ECG/SpO ₂ Continuous (using legacy SpO ₂ cable/sensors. Only one radio active.)	15.6 hours	14.1	15 hours
ECG/SpO ₂ Manual	In this mode battery life is dependent on the usage rate and will range between the ECG Only battery life and the ECG/SpO ₂ Continuous battery life.		

Monitor Mode Networked (Display On)	Battery Life (1.4GHz p/n 865350)	Battery Life (2.4GHz p/n 865351)	Battery Life (WLAN p/n 865352)
ECG Only (only one radio active)	11 hours	10.4 hours	11 hours
ECG/SpO ₂ Continuous (using legacy SpO ₂ cable/sensors. Only one radio active.)	8 hours	7.8 hours	8 hours
ECG/SpO ₂ Manual	In this mode battery life is dependent on the usage rate and will range between the ECG Only battery life and the ECG/SpO ₂ Continuous battery life.		

Monitor Mode Non-networked (Display On)	Battery Life (1.4GHz p/n 865350)	Battery Life (2.4GHz p/n 865351)	Battery Life (WLAN p/n 865352)
ECG Only (only one radio active)	13 hours	10.4 hours	12 hours
ECG/SpO ₂ Continuous (using legacy SpO ₂ cable/sensors. Only one radio active.)	8.8 hours	7.8 hours	8.5 hours

Battery Specifications

Monitor Mode Non-networked (Display On)	Battery Life (1.4GHz p/n 865350)	Battery Life (2.4GHz p/n 865351)	Battery Life (WLAN p/n 865352)
ECG/SpO ₂ Manual	In this mode battery life is dependent on the usage rate and will range between the ECG Only battery life and the ECG/SpO ₂ Continuous battery life.		

Note — Use of the short-range radio can reduce battery life by 25%.

Note — The battery capacity of re-chargeable batteries degrades over time and number of recharge cycles. Toward the end of its useful life, the battery capacity may be reduced by 25-30%. If this reduced battery life is unacceptable based on your use model, Philips recommends replacing the rechargeable battery sooner.

Nominal Current

Operating Mode	Nominal Current (p/n 865350)	Nominal Current (p/n 865351)	Nominal Current (p/n 865352)
ECG Only (Display inactive)	67 mA @ 3.6V	67 mA @ 3.6V	70 mA @ 3.6V
ECG/SpO ₂ Continuous (Display inactive)	136 mA @ 3.6V	136 mA @ 3.6V	140 mA @ 3.6V

Lithium-ion Battery Charge Time

Definition	Charging Method	Charge Time
Battery pack charge time from 90% depletion state	The Lithium-ion Battery Pack is charged on a separate external charging station. It must be removed from the MX40 to charge.	6.5 hours

Physical Specifications

Parameter	Specification
Height	126.8 mm (4.99 in)
Width	69.9 mm (2.75 in)
Depth	31.5 mm (1.24 in)
Weight <ul style="list-style-type: none"> Without batteries, includes SpO₂ and short-range radio With 3 AA batteries, includes SpO₂ and short-range radio With lithium-ion battery, includes SpO₂ and short -range radio 	1.4 GHz - 240 g (8.5 oz) 2.4 GHz - 215 g (7.6 oz) WLAN - 206 g (7.3 oz) 1.4 GHz - 324 g (11.4 oz) 2.4 GHz - 298 g (10.5 oz) WLAN - 292 g (10.3 oz) 1.4 GHz - 314 g (11.1 oz) 2.4 GHz - 289 g (10.2 oz) WLAN - 274 g (9.7 oz)
Display <ul style="list-style-type: none"> Type View Area Resolution Backlight ECG Display Sector Size (height) ECG Display Sweep Speed Resp Display Sweep Speed 	<ul style="list-style-type: none"> 2.8" QVGA Color LCD 43.2mm x 57.6 mm (1.70" x 2.26") 240 x 320 White LED 13.5mm (portrait), 9.9mm (landscape) 10mm/s with 4.32 sec of viewable ecg data (portrait), 10mm/s with 5.76 sec of viewable ecg data (landscape) 2.5mm/s with 17.28 sec of viewable resp data (portrait) 2.5mm/s with 23.04 sec of viewable resp data (landscape).
Alarm Signal Sound Pressure Level	40dB(A) - 70dB(A)

MX40 1.4 GHz Smart-Hopping Radio

Parameter	Specification
Frequency Ranges	Bands: 1395-1400 MHz and 1427-1432 MHz Channel Spacing: 1.6 MHz
RF Output Power (existing systems)	8 dBm +/-1.5 dB (4.5 mW to 10 mW), into antenna load
Radio Frequency Accuracy during normal operation	<+60/-100 KHz relative to channel frequency, includes temperature compensation and aging effects
Modulation Type	GFSK (1M40Q7D)
Out of Band Spurious Emission Levels: <= 1394 MHz, >= 1401 MHz <= 1428 MHz, >= 1433 MHz	<-41 dBm in 1 MHz bandwidth for FCC limit
Occupied bandwidth as defined by power in 99% BW	< +/- 800 KHz

1.4GHz WMTS (US only)

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference. Operation of this equipment requires the prior coordination with a frequency coordinator designated by the FCC for the Wireless Medical Telemetry Service.

MX40 2.4 GHz Smart-Hopping Radio

Parameter	Specification
Frequency Range	ISM Band: 2400 - 2483.5 MHz
Channel Assignment	48 radio channels assigned from 2401.056 MHz - 2482.272 MHz Channel Spacing: 1.728 MHz
RF Output Power	FCC: Channels 0-46 -17 dBm +/- 1 dB (40 mW to 63 mW, nominal 50 mW), into antenna load. Channel 47 only - 15 dBm +/- 1 dB. ETSI: 12 dBm +/- 1 dB (13 mW to 20 mW, nominal 16 mW), into antenna load ARIB: 13.5 dBm +/- 1 dB (18 mW to 28 mW, nominal 22 mW), into antenna load
Radio Frequency Accuracy during normal operation	<+ 60 /- 100 KHz relative to channel frequency, includes temperature compensation and aging effects
Modulation Type	GFSK, Gaussian Frequency Shift keying (1M40Q7D)
Modulation Bandwidth	Typically 1.4 MHz (20 dB Bandwidth) Typically 980 KHz (6 dB Bandwidth)
Out of Band Spurious Emission Levels	Meets ETSI, RS210, FCC, ARIB standards

2.4 GHz ISM

FCC and Industry Canada Radio Compliance: This device complies with Part 15 of the FCC Rules and RSS-210 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications to this equipment not expressly approved by Philips Medical Systems may cause harmful radio frequency interference and void your authority to operate this equipment.

The radio device used in this product is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC (Radio Equipment and Telecommunications Terminal Equipment Directive). Class 2 radio equipment. Member states may apply restrictions on putting this device into service or placing it on the market. This product is intended to be connected to the Publicly Available Interfaces (PAI) and used throughout the EEA.

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.

MX40 Short-Range Radio

Parameter	Specification
Frequency Ranges	ISM Band: 2400-2483.5MHz
Radio Channel assignment	16 Radio Channel assigned, $F_c = 2405 + 5 \cdot (k-11)$ MHz, $k=11,12,\dots,26$
Frequency Control	Configured via the bedside monitor or the Information Center depending on use model.
RF Output Power	-1.5 to -4.5 dBm $\pm 2/-3$ dB (0.7 mW to 0.3 mW), into Antenna load.
MX40 Frequency Accuracy during normal operation	$< \pm 40$ ppm, includes temperature compensation & aging effects
Modulation Type	Direct Sequence Spread Spectrum (DSSS), O-QPSK with half sine pulse shaping modulation (1M40Q7D)
Modulation Bandwidth	> 500 KHz, typically ± 950 KHz (6dB Bandwidth), typically ± 1.4 MHz (20dB Bandwidth)

MX40 2.4GHz WLAN Radio

The MX40 2.4GHz/5.6GHz WLAN Radio conforms to the 802.11 a/b/g standard operating in the 2.4GHz and 5.6GHz ISM bands.

Note — For the MX40 WLAN device, Part Number 865352, use of the MX40's short-range Radio is only supported when operating with 802.11a (5.6GHz band).

The Radio characteristics are defined below.

WLAN Radio RF Specs	Specification
802.11b	
Technology	IEEE 802.11 b
Frequency Range	2.4 to 2.4835GHz
Transmitter Power	14 to 17 dBm into antenna load (RMS power)
Modulation	CCK (Complementary Code Keying)
Occupied Bandwidth, 99%	<-22 MHz
802.11g	
Technology	IEEE 802.11 g
Frequency Range	2.4 to 2.4835GHz
Transmitter Power	12 to 15 dBm into antenna load (RMS power)
Occupied Bandwidth, 99%	<-22 MHz
Modulation Type	OFDM (Orthogonal Frequency Division Multiplex)
Frequency Bands (802.11 b/g)	FCC, RS210, ETSI Japan{ARIB}, China, AU/NZ: 2.400 – 2.4835GHz
Out of Band Emissions (802.11 b/g)	Meets ETSI, RS210, FCC, ARIB, AU/NZ standards
802.11a	
Technology	IEEE 802.11 a
Frequency Power	5.15 to 5.825GHz
Transmitter Power	12 to 14 dBm into Antenna load (RMS power)
Occupied Bandwidth	≤ 18 MHz
Modulation	DSSS : OFDM (Orthogonal Frequency Division Multiplex)

WLAN Radio RF Specs	Specification
Frequency Bands (802.11a)	FCC, RS210: 5.15 ~ 5.25Ghz, 5.25 ~ 5.35Ghz, 5.42 ~ 5.725Ghz, 5.725 ~ 5.825Ghz (excluding 5.6 ~5.65GH ETSI, AU/NZ: 5.15~ 5.35Ghz, 5.47 ~ 5.725Ghz Japan, ARIB: 5.150 – 5.250GHz, 5.25 – 5.35GHz, 5.470 – 5.725GHz, China: 5.725 ~5.825Ghz
Out of Band Emissions (802.11a)	Meets ETSI, RS210, FCC, ARIB, AU/NZ standards

FCC and Industry Canada Radio Compliance

This device complies with Part 15 of the FCC Rules and RSS-210 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications to this equipment not expressly approved by Philips Medical Systems may cause harmful radio frequency interference and void your authority to operate this equipment.

- The maximum antenna gain permitted (for devices in the 5250-5350 MHz and 5470-5725 MHz bands) complies with the e.i.r.p. limits as stated in RSS-210.
- The maximum antenna gain permitted (for devices in the 5725-5825 MHz bands) complies with the e.i.r.p. limits specified for point-to-point operation as stated in RSS-210.
- The device for band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems.

Caution

High power radars are allocated as primary users of 5250-5350 MHz and 5650-5850 MHz. These radars could cause interference and/or damage to LE-LAN devices.

Environmental Specifications

Parameter	Specification
Temperature	
Operating	0 to 37° C (32 to 99° F)
Storage	-30° C to 50° C (-22° F to 122° F) without batteries 12° C to 35° C (53.6° F to 95° F) with Single-Patient-Use leadsets
Humidity	
Operating	< 95% RH at 37° C (98.6° F) non-condensing
Storage	< 90% RH at 50° C (122° F) without batteries
Altitude	
Operating & Non-operating	3,000 m (9,842 ft)
Barometric Pressure	72kPa (537 mmHg)

Measurement Specifications

ECG

Parameter	Specification
ECG channel transmitted Leads	
3 electrodes	Channel #1 = I, II, or III
5 electrodes	Channel #1 = II Channel #2 = III Channel #3 = MCL
5 electrodes, EASI	Channel #1 = Va-i Channel #2 = Va-s Channel #3 = Ve-s
6 electrodes	Channel #1= II Channel #2 = III Channel #3 = MCLa Channel #4 = MCLb
Resolution	5 μ V
ECG Input	Differential, defibrillator protected against 360 joules discharge into a 100 ohm load
Input Impedance	> 5 megohms (@ 10 Hz)
Input Dynamic Range	+/- 9 mV
DC Offset Range	+/- 320 mV
CMRR	\geq 90 dB @ 50, 60 Hz
Bandwidth +/- 3 dB	0.05 to 40 Hz
Gain Accuracy	+/- 5% at 25 °C (77 °F)
Noise Referred to ECG Input (Peak-to-Peak)	AAMI: 30 μ V (as per AAMI EC 13)
Lead Wires	3, 5 or 6-wire patient cable compatible with IntelliVue Patient Monitor, AAMI/IEC color codes
Time to baseline recovery from Defibrillator	AAMI: 5 s max (until ECG wave is on display but not yet centered, monitoring bandwidth)

Parameter	Specification																
Pacer Rejection Performance (Pace pulses with no tails).	<p>Positive pacers¹</p> <table border="0"> <tr> <td>Amplitude</td> <td>Width</td> </tr> <tr> <td>+2 to +700 mV</td> <td>0.1, 0.2, 0.5 and 1.0 ms</td> </tr> <tr> <td>+2 to +500 mV</td> <td>1.5 ms</td> </tr> <tr> <td>+2 to +400 mV</td> <td>2 ms</td> </tr> </table> <p>Negative pacers¹</p> <table border="0"> <tr> <td>Amplitude</td> <td>Width</td> </tr> <tr> <td>-2 to -700 mV</td> <td>0.1, 0.2, 0.5 and 1.0 ms</td> </tr> <tr> <td>-2 to -500 mV</td> <td>1.5 ms</td> </tr> <tr> <td>-2 to -400 mV</td> <td>2 ms</td> </tr> </table> <p>¹ Philips does not claim, verify, or validate support for all available pacemakers.</p>	Amplitude	Width	+2 to +700 mV	0.1, 0.2, 0.5 and 1.0 ms	+2 to +500 mV	1.5 ms	+2 to +400 mV	2 ms	Amplitude	Width	-2 to -700 mV	0.1, 0.2, 0.5 and 1.0 ms	-2 to -500 mV	1.5 ms	-2 to -400 mV	2 ms
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-2 to -500 mV	1.5 ms																
-2 to -400 mV	2 ms																
EMC Performance Limits, radiated immunity	Meets Essential Performance.																
ECG Patient Cable Disconnection Safety	All ECG connections are patient safe within 750 msec of patient cable removal, with patient leakage current <10 μ A. Exception: Leadset detection pins are protected mechanically to prevent patient contact.																

ECG Performance Disclosure/Specifications

Characteristic	Performance Disclosure/Specification (in italics)
Heart Rate Averaging Method	<p>Two different methods are used:</p> <ul style="list-style-type: none"> • Normally, heart rate is computed by averaging the 12 most recent RR intervals. • If each of 3 consecutive RR intervals are greater than 1200 milliseconds (i.e. rate less than 50 b/min) for adult and pediatric patients, then the 4 most recent RR intervals are averaged to compute the HR.
Heart Rate Meter Accuracy and Response to Irregular Rhythm	Provides correct heart rates (80, 60, 120, 90 b/min) using test waveforms as indicated in ANSI/AAMI EC13 Sec. 4. 1. 2. 1 (e).
Response Time of Heart Rate Meter to Change in Heart Rate	For a rate increase, the average time to reach the specified heart rate using test waveforms as indicated in ANSI/AAMI EC13 Sec. 4. 1. 2. 1 (f) is 10 seconds. For a rate drop, the average time is 7 seconds.

Measurement Specifications

Characteristic	Performance Disclosure/Specification (in italics)
Time to Alarm for Tachycardia	The ranges of time to alarm using test waveforms as indicated in ANSI/AAMI EC13 Sec. 4.1.2.1 (g) are 4 to 5 seconds.
Pacemaker Pulse Rejection Capability	Rejects pace pulses using test waveforms as indicated in ANSI/AAMI EC13 Sec. 4.1.4.1 (with amplitude from +/- 2 to +/- 700 mV, width from 0.1 to 2.0 ms).
Range and Accuracy of Heart Rate Meter	Meets the ANSI/AAMI EC13 Section 4.2.7 recommended minimum range and accuracy. Heart rate range is 15 - 300 b/min for adults patients and 15-350 b/min for pediatric patients with accuracy of $\pm 1\%$ of the range. (Note: for rates equal to or less than 15, the displayed heart rate is 0).
Alarm Limit Range	Meets the ANSI/AAMI EC13 Section 4.2.8.1 standard. Lower alarm limit is 15 -295. Upper alarm limit is 20 - 300.
Resolution of Alarm Limit Settings	Meets the ANSI/AAMI EC13 Section 4.2.8.2 standard. The resolution is ± 5 b/min.
Alarm Limit Accuracy	Meets the ANSI/AAMI EC13 Section 4.2.8.3 standard. Error less than $\pm 10\%$ or ± 5 b/min
Time to Alarm for Cardiac Standstill	Meets the ANSI/AAMI EC13 Section 4.2.8.4 standard: maximum alarm time <10 seconds, using the test waveforms as indicated.
Time to Alarm for Low Heart Rate	Meets the ANSI/AAMI EC13 Section 4.2.8.5 standard: maximum alarm time <10 seconds, using the test waveforms as indicated.
Time to Alarm for High Heart Rate	Meets the ANSI/AAMI EC13 Section 4.2.8.6 standard: maximum alarm time <10 seconds, using the test waveforms as indicated.
Alarm Silencing	The time required for reactivation of a latched, silenced alarm is 3 minutes
ECG Waveform Display Time Base Accuracy	<i>Meets the ANSI/AAMI EC13 Section 4.2.9.6 standard: maximum error = +/-10%.</i>
Channel Width	<i>Meets the ANSI/AAMI EC13 Section 4.2.9.7(a) standard: minimum = 30mm.</i>
Trace Width	<i>Meets the ANSI/AAMI EC13 Section 4.2.9.7(b) standard: maximum = 1.0mm.</i>
Aspect Ratio	<i>Meets the ANSI/AAMI EC13 Section 4.2.9.7(f) standard: 0.4 ± 0.08 s/mV.</i>
Input Signal Reproduction Accuracy: Overall Error	<i>Meets the ANSI/AAMI EC13 Section 4.2.9.8(a) standard: maximum = +/- 20%.</i>
Frequency Response: Sinusoidal	<i>Meets the ANSI/AAMI EC13 Section 4.2.9.8(b) standard: 0.67 to 40 Hz (3 db down).</i>

Characteristic	Performance Disclosure/Specification (in italics)
Frequency Response: Triangular	<i>Meets the ANSI/AAMI EC13 Section 4.2.9.8(b) standard: 0 to 25% reduction.</i>
Impulse Response: (for waves marked with ST bandwidth)	<i>Meets the ANSI/AAMI EC13 Section 4.2.9.8(c) standard: displacement maximum = 0.1 mV; slope maximum = 0.30 mV/s.</i>
Pacemaker Pulse Display Capability	<i>Meets the ANSI/AAMI EC13 Section 4.2.9. 12 standard: minimum = 0.2 mV RTI.</i>
Tall T-Wave Rejection Capability	Meets AAMI standard: 0.5 – 40 BW: HR of 80bpm at all T-wave amplitudes 0.05 – 40 BW: HR of 80bpm at all T-wave amplitudes

Respiration

Parameter	Specification
Leads Used for Measurement	RA, LL (standard) or I, A (EASI)
Range	Adult/Pedi: 0 to 120 rpm
Bandwidth	0.3Hz to 2.5Hz (-6dB)
Noise	Less than 25 mOhm (rms) referred to the input
Calibration Signal	Signal: 1 Ohm p-p; Accuracy: +/- 20%
Respiration Rate Resolution	1 rpm
Respiration Accuracy	+/- 1 rpm for 0-120 rpm
Auxiliary Current, Respiration Excitation Signal	< 470 uA rms @48KHz, sinusoidal waveform

Respiration Alarm

Alarm	Range	Delay
High	Adult/Pediatric: 10 to 100 rpm	≤ 15 seconds
Low	Adult/Pediatric: 0 to 95 rpm	for limits from 0 to 20 rpm: max. 4 seconds for limits above 20 rpm: max. 15 seconds
Apnea Alarm	10 to 40 seconds	Incremental delay 5 seconds max.

Measurement Specifications

FAST SpO₂

Parameter	Specification
SpO ₂ Measurement Range (Calibration and Display)	0 to 100%
SpO ₂ Accuracy	See table following.
SpO ₂ Resolution	1%
SpO ₂ Numerics - Averaging	5 - 20 seconds (default = 10 seconds) Note —The update rate for the SpO ₂ pulse oximetry value and pulse rate is typically 1 second. This can be extended to a max. 60 s when NBP is measured on the same limb, with a corresponding INOP message after a max. of 30 s, indicating that the displayed values are not current values. The effect of SpO ₂ pulse oximetry on data averaging is internally controllable by the patient worn monitor MX40, with no user controls.
SpO ₂ & Pulse Numerics - Update Rate	Transmitted once per second. Note —The update rate for the SpO ₂ pulse oximetry value and pulse rate is typically 1 second. This can be extended to a max. 60 s when NBP is measured on the same limb, with a corresponding INOP message after a max. of 30 s, indicating that the displayed values are not current values.
Pleth Wave- Sampling Rate	125 sps
Technical Alarms (INOPs)	Triggered if the sensor is disconnected, if a pulse is not detected, if the signal is noisy, if light interference is detected, if the sensor is defective, if the measurement is erratic, or if the module is malfunctioning
Wavelength Range	500 to 1000 nm Note —Information about wavelength range can be especially useful to clinicians (e.g., clinicians performing photodynamic therapy).
Pulse Rate Measurement (available only with Continuous SpO ₂)	Range: 30 to 300 bpm Accuracy: +/- 2% Resolution: 1 bpm

Parameter	Specification
Display of SpO ₂ numerics	SpO ₂ values are displayed as xxx % SpO ₂ to meet ISO 9919.
Emitted Light Energy	≤ 15 mW

SpO₂ Sensor Accuracy

Type	Description	Model Number	Accuracy % ^A _{rms} (70-100% Range)
Reusable Sensors			
	Adult Finger, 2m cable	M1191B	2.0
	Adult Finger, 3m cable	M1191BL	2.0
	Adult Finger, 0.45m cable	M1191T	3.0
	Pediatric, Small Adult Finger, 1.5m cable	M1192A	2.0
	Pediatric, Small Adult Finger, 0.45m cable	M1192T	3.0
	Adult & Pediatric Ear Clip, 1.5m cable	M1194A	3.0
	Adult Finger Clip, 3m cable	M1196A	3.0
	Adult Finger Clip, 2m cable	M1196S	3.0
	Adult Finger Clip, 0.9m cable	M1196T	3.0
	LNCS Adult Reusable Sensor	Masimo LNCS DC-I	2.0
	LNCS Pediatric Reusable Sensor	Masimo LNCS DC-IP	2.0
	LNCS Tip-Clip Ear Reusable Sensor	Masimo LNCS TC-I	3.5
	LNOP Adult Reusable Sensor	Masimo LNOP-DC-I	2.0
	LNOP Pediatric Reusable Sensor	Masimo LNOP DC-IP	2.0
	LNOP Tip-Clip Reusable Sensor	Masimo LNOP TC-I	3.5

Type	Description	Model Number	Accuracy % ^A _{rms} (70-100% Range)
Single Patient Use Sensors			

Measurement Specifications

Type	Description	Model Number	Accuracy % Arms (70-100% Range)
	Adult Finger, > 40kg	M1901B	3.0
	Pediatric 3-20kg	M1902B	3.0
	Pediatric Finger, 10-50kg	M1903B	3.0
	Adult Finger, >30kg	M1904B	3.0
	Adult, Pediatric > 20kg	M1131A	3.0
	Adult Finger, > 30kg	Nellcor OxiMax Max-A	3.0
	Adult Finger, > 30kg	Nellcor OxiMax Max-AL	3.0
	Adult Finger > 40kg	Nellcor OxiMax Max-N	3.0
	Pediatric	Nellcor OxiMax Max-P	3.0
	Pediatric	Nellcor OxiMax Max-I	3.0
	Adult Finger > 30kg	Nellcor Oxisensor II D-25	3.0
	Adult Finger > 40kg	Nellcor Oxisensor II N-25	3.0
	Pediatric Finger 10-50kg	Nellcor Oxisensor II D-20	3.0
	Adult Finger	Nellcor OxiCliq A	3.0
	Pediatric Finger	Nellcor OxiCliq P	3.0
	Pediatric	Nellcor OxiCliq I	3.0
	Adult Finger > 40kg	Nellcor OxiCliq N	3.0
	Pediatric Adhesive	Masimo LNOP PDT	2.0
	Pediatric Adhesive	Masimo LNOP PDTx	2.0
	Adult Adhesive	Masimo LNOP ADT	2.0
	Adult Adhesive	Masimo LNOP ADTx	2.0
	Adult Adhesive	Masimo LNCS ADTx	2.0
	Pediatric Adhesive	Masimo LNCS PDTx	2.0

Type	Description	Model Number	Accuracy % ^Arms (70-100% Range)
	Adult Adhesive	Masimo LNCS Neo-3	2.0

EQUIP# MVD01

Philips Brilliance
LCD widescreen monitor

58 cm (23")

WUXGA

Brilliance

230W5VS



the smart way to boost productivity

Productivity pays: Look to the Philips 230W5 with SmartManage - remote, LAN-based monitor management - for professional motion picture, video, CD and DVD post production work that demands a big, wide screen, PiP and input source variety.

Outstanding front of screen performance

- WUXGA, wide format 1920x1200 resolution for sharper display
- Fast response time for great display of moving images
- Widest viewing angle up to 176 degrees
- Dual input accepts both analog VGA and digital DVI signals

Multi-function for ultimate convenience

- A solid-state 6-in-1 card reader for easy media access
- Built-in high-speed USB 2.0 solution for easy connections
- Display from multiple video sources: YPbPr, S-Video, and CVBS
- Displays PC data while viewing video or TV in a window

Great convenience

- Embedded power supply eliminates external power adaptors
- VESA mounting pattern for easy wall mounting of display
- Easy plug-and-play DVI for a true digital experience

PHILIPS

sense and simplicity

TYPICAL, NOT FINAL FOR DESIGN ONLY, NOT FOR CONSTRUCTION TYPICAL, NOT FINAL

LCD widescreen monitor
58 cm (23") WUXGA

Highlights

WUXGA, wide format 1920 x 1200

Wide format of Ultra Extended Graphics Array, a display specification that is capable of displaying 1920 x 1200 resolution, or approximately 2.3 million pixels.

Fast response time

Response time measures signal reaction speed in milliseconds. On/off response time measures the time required for the screen to turn from completely white to completely black and vice versa. Fast on/off response time improves display of text. Gray-to-grey response time measures the average time of transition between several sets of random gray levels - Lower numbers mean faster transitions. Faster is better because a fast response time eliminates visible image artifacts that could dampen your experience when viewing fast moving images or objects.

Widest viewing angle

The widest viewing angle up to 176 degree provides the clearest display from any angle.

Dual input

Dual input provides connectors to accommodate input of both analog VGA and digital DVI signals.

Universal card reader (UCR)

A UCR is a device that reads data from portable media and transfers data to PC. It reads data from SD/MMC, Memory Stick, Smart Media and two types of Compact Flash memory cards without an additional peripheral.

USB connectivity solution

The universal serial bus or USB is a standard protocol for linking PCs and peripherals. Because it delivers high speed at a low cost, USB has become the most popular method for connecting peripheral devices to a computer. By placing a USB 2.0 solution in a monitor, Philips provides a conveniently located, easy-to-use, high-speed USB connection for reading, writing, loading and transferring programs, data, digital media or music files to, from or among your PC and one or more USB devices.



Video connection

Plugs to accommodate signal input from a variety of sources

Picture in Picture

PIP enables the viewing of a small television or video window at a selected location in a full-screen display.

Embedded power supply

An embedded power supply is a power adaptor built into the body of a display device that replaces a bulky external power adaptor.

VESA mounting holes

A unified industry standard for wall mounting IT equipment set by the Video Electronics Standards Association.

In-box DVI cable

A DVI cable is shipped with the product to provide high quality digital display.

Large viewing area

Viewing area is the visible portion of a monitor screen available for displaying data.

Screen tilt and swivel

Screen tilt and swivel is a mechanism built into the base permits the monitor to swivel and tilt backward or forward.

Widescreen

A big, widescreen display that improves productivity by displaying two A4 pages side-by-side.

Front connections

A USB 2.0 hub and an universal card reader (UCR) located on the front side of monitor for convenient and efficient access.

SmartManage enabled

SmartManage is a system for monitoring, managing and checking status of display devices as well as delivering remote support to users who experience difficulties - all accomplished over a LAN.

Specifications

Picture/Display

- LCD panel type: 1920 x 1200 pixels, Anti-glare polarizer, RGB vertical stripe
- Panel Size: 23" / 58.4 cm
- Effective viewing area: 495.4 x 309.6 mm
- Pixel pitch: 0.258 (H) x 0.258 (V) mm
- Brightness: 250 cd/m²
- Contrast ratio (typical): 500:1
- Display colors: 16 M
- Viewing angle: @ C/R > 10
- Viewing angle (H / V): 176 / 176 degree
- Response time (typical): 16 ms
- White Chromaticity, 6500K: x = 0.313 / y = 0.329
- White Chromaticity, 9300K: x = 0.283 / y = 0.297
- Maximum Resolution: 1920 x 1200 @ 60Hz
- Optimum resolution: 1920 x 1200 @ 60Hz
- Factory Preset Modes: 20 modes
- User definable modes: 15 modes
- Horizontal Scanning Frequency: 30 - 94; 28 - 94 (YPbPr) kHz
- Refresh Rate (V): 56 - 85 Hz
- Aspect ratio: 16:10
- Picture enhancement: Picture in Picture, Progressive scan

Connectivity

- Audio input for PC: 3.5mm Phone Jack x 2
- Audio input for video: Audio Left/Right (RCA x 2)
- AV 1: CVBS in, S-Video, YPbPr
- Other connections: Stereo line out
- Signal Input: VGA (Analog), DVI-I
- USB: USB 2.0
- Other video input: Component Video, S-Video

Convenience

- Built-in Audio: 3W RMSx2 stereo speakers
- User convenience: On-screen Display
- Monitor Controls: Auto, Brightness Control, Left/Right, Menu (OK), Power On/Off, Up/Down, Volume control
- OSD Languages: English, French, German, Italian, Simplified Chinese, Spanish, Japanese
- Other convenience: Kensington lock
- Plug & Play Compatibility: DDC CI, Windows 98/ME/2000/XP
- Regulatory approvals: CE Mark, FCC-B, UL, CSA, NUTEK, Energy Star, SEMKO, TCO '03, TÜV/GS, TÜV Ergo
- Swivel: +/- 170°
- Tilt: -5 degree to +20 degree
- VESA Mount: 100 x 100 mm

Accessories

- User Manual
- Included accessories: AC Power Cord, PC audio cable, USB cable, VGA cable, DVI-D cable

Dimensions

- Dimensions (with base) (W x H x D): 548 x 452 x 250 mm
- MTBF: 50,000 hrs
- Relative humidity: 20% - 80%
- Temperature range (operation): 5°C to 35°C
- Temperature range (storage): -20°C to 60°C
- Weight: 9 kg

Power

- Complies with: Energy Star, NUTEK
- Consumption (On mode): 90W (Typical)
- Consumption (Off Mode): < or = 2 W
- Power LED indicator: Operation - Blue, Stand by/sleep - Amber
- Power supply: Built-in



Issue date 2011-06-07

Version: 3.0.4

12 NC: 8639 000 15335

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www.philips.com

Patient Display Boards

PAR Display, PAR Select, PAR Record and PAR Replenish Products

Par Display – 14 and 28 bed versions

Par Select, PAR Record and PAR Replenish use 14 bed specifications unless noted.

Mechanical

Size	PDB – 14 display	10" W x 19.5" H 15-1/4" W X 19.5" H including down loaders
	PDB – 28 display	16.5 W x 19.5" H 21-3/4" W X 19.5" H including down loaders
Construction	Case	Formed Kydex – acrylic/PVC alloy
	Overlay	Polyester
Installation	Construction	Sheet metal chassis with formed cover
	Mounting	Wall mounted bracket
Wall Space Required		Includes attached downloader and pending board on right
		Display 14 - 22" W X 19.5" H
		Display 28 - 28" W X 19.5" H
		Display 28 & Aux 14 - 38" W X 19.5" H
		Display 28 & Aux 28 - 45" W X 19.5" H
Facilities	Power Cabling	Bottom entry input power cord with locking connector
	Communications	Bottom entry telephone or Ethernet connector
	Power Requirement	Single outlet (one plug)
Network Connection		Single RJ-45 10/100 Ethernet connection
		Fixed IP or DHCP operation
Weight	PDB - 28 display	10.5 lbs
	PDB - 14 display	7 lbs
Temp	Operating	55-120F
	Storage	40-150F
Humidity		10% - 90% non-condensing
Power		
Type		Plug in AC adapter Jerome TPFN24-05M 44 VA rating UL File Number – E160908
Primary	Voltage	120 VAC +/- 20% 50-60 Hz
	Current	0.25A nom
Input	Voltage	24 VAC 50-60Hz
	Current	920 mA continuous duty rating
Backup	Type	Internal sealed rechargeable battery – 12 volt
	Charger	Float charger
Communications		
Telephone	Modem Type	Internal serial modem
	Speed	2400-14.4K User selectable
	Protocol	Proprietary
	Error Control	MNP4
	Connector	Panel Mount RJ-11
Network	Cable	Supplied with 6' phone cord with 2 RJ-11 connectors
	Protocol	Ethernet IEEE 802.3
	Speed	10 MB fixed – 10/100 allowed
	Line Protocol	Half Duplex
	Cabling	Standard Cat 5
	Protocol	TCP/IP
	Address	DHCP or Static
Connection	Panel mount RJ-45	
Capacity		
	Patient Names	PAR Display – 84 max

General Equipment Specification – June 2015

Transactions PAR Select – 1600 max
5000 iButton reads



This medium-duty commercial microwave features the durable quality and easy maintenance of a stainless steel interior. The cost-efficient R-21LCF also has a super-rugged grab handle.

Features:

Stainless Steel Interior and Door are designed with a high-grade stainless steel that is featured in every oven in Sharp's commercial line. They're easy to clean and resists pitting, chipping, scratching and erosion, even with a tough schedule of everyday use.

Cool Gray Cabinet and Stainless Door provide a streamlined, style-setting look that suits any situation — from snack bars to offices.

Dependable 6-Minute Light Up Dial Timer is clearly marked in 10, 15 and 30 second increments for easy-to-set, easy-to-read convenience. When the door is opened during cooking, the remaining time is canceled eliminating the oven being on without a food load. Increments are lettered for use with coded foods.

1,000 Watts of Power built for fast, efficient heating.

Heating Time Guide charts proper times needed to heat a variety of popular foods. It's a handy "on-the-spot" reference for timesaving convenience.

Sturdy Grab Handle designed to stand up to the daily demands of the medium-duty user, providing easy access.

End of Heating Signal lets user know when food is ready.

Interior Oven Light lets you view food as it cooks to monitor progress. See-through door and oven light promote maximum visibility.

Ease of Cleaning of the rubber-sealed ceramic shelf makes it easy to keep oven in "ready-for-inspection" order.

Specifications

Model	R-21LCF
Output Wattage (IEC Procedure)	1000 watts
Stainless Steel Interior	Yes
Cool Gray Cabinet & Door	Yes
Power Requirements	1.6 kW, 14.0 A
Receptacle Required	15 Amp., NEMA -15 R
Cord Length (in inches)	63
Warranty*	Sharp commercial microwave ovens have a reputation for unsurpassed quality in the foodservice industry. This Sharp commercial microwave oven is backed by a three-year limited warranty on the magnetron tube and one-year warranty on parts and labor with service provided in the end-user's place of business. See Operation Manual for complete details.
Outside Unit Dimensions (w x h x d, in inches)	20-1/2 x 12-1/8 x 16
Outside Unit Dimensions with Door Open (in inches)	31-1/4
Cavity Dimensions (w x h x d, in inches)	13-7/8 x 8-1/8 x 14-5/8
Net Weight / Shipping Weight (in pounds)	37 / 44
UPC	074000616493

HA-08F-007

*1 See warranty statement included in the product operation manual available as a PDF download at www.sharppusa.com.

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All other trademarks are property of their respective owners.

Design and specifications subject to change without notice. See operation manual for complete details.

To Specify a Sharp R-21LCF Medium-Duty Commercial Microwave Oven - Oven shall comply with standards set by the U.S. Department of Health and Human Services, FCC, NSF-4 and UL and shall display such labels. Oven shall be equipped with 6-minute Light Up Dial timer marked in 10, 15 and 30 second increments. Remaining time will be canceled if the door is opened during cooking. Heating Time Guide and instructions shall be visible on oven control panel. Output wattage shall be 1000 watts. Bottom feed distribution system shall provide uniform heating pattern. Oven cavity shall be of stainless steel construction with see-through stainless oven door. Cavity shall be illuminated. Bottom of cavity shall consist of rubber-sealed ceramic shelf. Oven shall have three-year limited warranty on the magnetron tube; one-year parts and labor with service provided in the end-user's place of business.



Built to meet rugged commercial standards. Complies with DHHS & FCC.

SHARP ELECTRONICS CORPORATION

Sharp Plaza, Mahwah, NJ 07495-1163

For more information call: 201-529-8619 or 1-800-BE-SHARP

www.sharppusa.com

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EQUIP# REF01

FOLLETT



Laboratory | Pharmacy
Upright Refrigerators

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Healthcare's most advanced refrigerators

From the leader in medical-grade undercounter refrigerators and freezers – high-performance upright refrigerators designed specifically for healthcare. From back plenum air ducts that ensure consistent, cabinet-wide cooling, to a feature rich, intuitive alarming and display interface, Follett® upright refrigerators take the worry out of critical product storage, allowing your staff to focus on the job at hand.



Easy-to-read interface provides alarming, monitoring and user-selectable features

- 3" (8 cm) LCD continuously displays product temperature
- Temperature display in user-selectable C or F to meet needs of different areas
- Audible and visual alarms
 - High and low temperature
 - Power failure
 - Door ajar
 - Probe error
 - Low backup battery
- User-adjustable alarm mute intervals (up to 60 minutes) with auto ring back
- User-selectable/programmable features
 - High and low alarm set points
 - Alarm volume
 - Audible alarm mute
 - Backup battery status
 - Minimum and maximum temperature log
 - Probe calibration to 0.1C/F accuracy
 - Bottom temperature display (when optional bottom probe supplied)
 - Password protection
 - Date and time

Multiple interfaces for remote alarming and monitoring

- RS-485 port streams temperature, alarm and system performance data
- Dry contacts (NO and NC) allow remote alarming to other areas in the facility
- Left side access port provides easy probe entry for third-party monitoring systems



Only Follett offers user-selectable F or C temperature and alarm display.



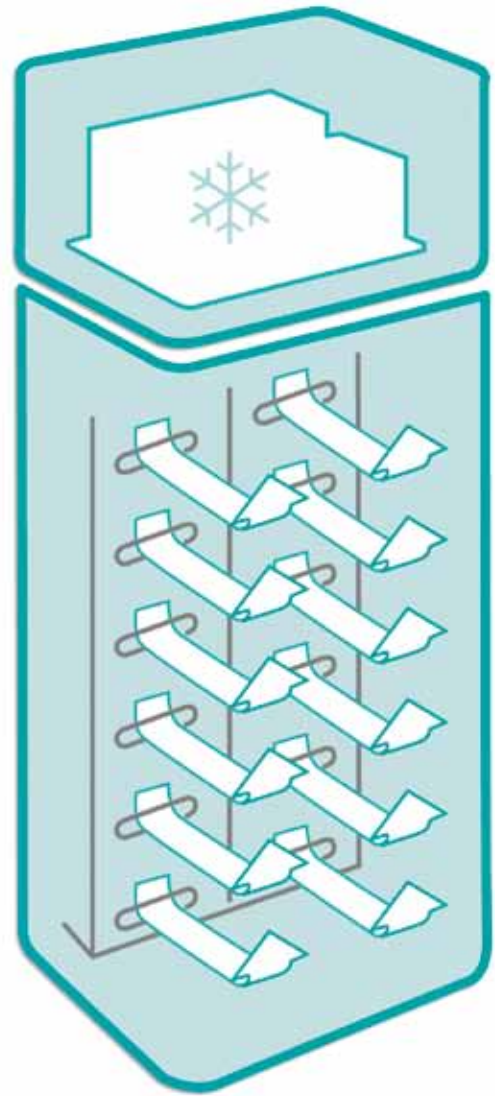
Advanced air distribution design delivers superior temperature consistency

Follett upright refrigerators feature the industry's most advanced airflow design. Our exclusive back plenums deliver cold air to six levels, ensuring consistent temperature of all product, even with heavily loaded shelves or baskets.

- Eliminates the need to carefully load product to allow air circulation
- Increases true storage by eliminating hanging evaporator designs
- Holds better than ± 1 C (± 1.8 F) temperature at all levels in the cabinet

Powerful top-mounted refrigeration module provides the performance required for your critical product

- $\frac{1}{3}$ hp hermetically sealed compressor, wide-fin condenser and heavy-duty fan provide quick temperature pull down and rapid recovery following door openings
- Environmentally responsible, non-CFC R-134a refrigerant delivers high efficiency ratings and supports LEED EA Credit 4
- Adjustable refrigeration system controls via front interface
 - Compressor cut-in/cut-out
 - Refrigeration cycle
 - Door heater power cycle
- No defrost cycle – Follett's off-cycle design keeps coils frost free, resulting in less system complexity and no heating elements that can compromise product temperatures



Outstanding serviceability

Follett's innovative single module design allows the entire refrigeration system to be removed as one unit without cutting refrigerant lines. If needed, a spare system can slide into place, virtually eliminating downtime. Routine vacuuming of the condenser face can be done from the front of the refrigerator.



Full stainless steel cabinet and high quality components designed with the user in mind

- Stainless steel exterior, interior and interior hardware resist scratches and rust experienced with powder-coated surfaces
- 29.75" (76 cm) width and 79.5" (202 cm) height (with casters) allow easy entry through standard doors
- Industry-leading 2.75" (7 cm) thick foam insulation saves energy and reduces system run time
- Dished stainless floor contains spills for easy clean up
- Heavy-duty dual wheel locking casters roll easily
- Snap-off front and removable side panels allow quick and complete access to refrigeration module
- Backup batteries accessible behind hinged panel door
- RTD stainless top probe
- Easy-to-reach top front bottle for convenient alarm checking

Heavy-duty glass doors provide ease of use and important energy savings

- Right-hinged (left optional), full view locking doors with ADA-compliant full length handle
- Energy-efficient, dual-pane glass with low-E coating reduces energy loss by 30 - 50%
- Superior glass pack design remains condensation free to 26 C (80 F) 60% RH, making heated doors unnecessary for most applications (heated doors available as option)
- Magnetic gasket holds door securely closed and snaps into molded track for easy replacement
- Self closing door locks open at 90 degrees to allow easy product loading
- Inset hinges allow positioning next to walls or other equipment without opening interference



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The industry's preferred lighting solution features energy-efficient, cool LEDs

- Instant-on LEDs eliminate delay of fluorescent bulbs
- Full length light bars illuminate all shelves or baskets
- LEDs consume less energy and provide longer life (50,000 hour rating) than fluorescents
- Nil heat LEDs allow product placement next to lights for increased storage capacity
- Auto-on lighting with door opening and ON/OFF front panel switch

Choice of superior storage options

- 4 heavy-duty epoxy-coated shelves, adjustable in 1/2" (1 cm) increments are standard on "LB models"
- Industry-exclusive "floating" basket system on "PH models"
 - 6 full extension, epoxy-coated "floating" baskets move with a gentle push or pull
 - Shielded stainless steel bearings and stainless steel S-track design eliminate binding and uneven wear found with loose bearing systems
 - Baskets and slide assemblies lift out without tools for full cleaning access

Factory-installed options

- Left hinged door
- Heated door and frame
- Integral 6" (15 cm), 7-day chart recorder

Accessories

- Additional shelves (LB models only)
- Brackets for compatibility with automated medication dispensing systems
- Glycerin
- Wall anchor kit (CA seismic)
- Replacement chart paper and pens



Specifications

	REF20-LB	REF25-LB	REF20-PH	REF25-PH
Normal capacity	19.7 cu ft (558 L)	24.6 cu ft (697 L)	19.7 cu ft (558 L)	24.6 cu ft (697 L)
Storage system	(4) epoxy-coated shelves	(4) epoxy-coated shelves	(6) epoxy-coated baskets	(6) epoxy-coated baskets
Exterior width	29.75" (76 cm)	29.75" (76 cm)	29.75" (76 cm)	29.75" (76 cm)
Exterior depth	29" (74 cm)	35" (89 cm)	29" (74 cm)	35" (89 cm)
Exterior depth with handles	30.5" (78 cm)	36.5" (93 cm)	30.5" (78 cm)	36.5" (93 cm)
Exterior height with casters	79.5" (202 cm)	79.5" (202 cm)	79.5" (202 cm)	79.5" (202 cm)
Interior dimensions (W x D x H)	24" x 22.5" x 56" (61 cm x 58 cm x 143 cm)	24" x 28.5" x 56" (61 cm x 73 cm x 143 cm)	24" x 22.5" x 56" (61 cm x 58 cm x 143 cm)	24" x 28.5" x 56" (61 cm x 73 cm x 143 cm)
Door swing	56.5" (144 cm)	62.5" (159 cm)	56.5" (144 cm)	62.5" (159 cm)
Crated weight	395 lbs (180 kg)	430 lbs (196 kg)	460 lbs (209 kg)	500 lbs (227 kg)
Net weight	292 lbs (132 kg)	317 lbs (144 kg)	382 lbs (173 kg)	415 lbs (188 kg)
Max. heat rejection	950 BTU/hr	1050 BTU/hr	950 BTU/hr	1050 BTU/hr
Avg. energy consumption	4.8 kWh/day	4.8 kWh/day	4.8 kWh/day	4.8 kWh/day

Standard features – all models

Operating range	Factory preset at 4 C (39 F), user-adjustable 1 C – 10 C (34 F – 50 F)
Door	Dual pane, low-E glass, condensation free to 26 C (80 F) air/60% RH
Door handle	ADA-compliant, full length handle with integral lock
Interior/exterior material	Heavy-duty, corrosion resistant stainless steel
Display	3" (8 cm) LCD temperature display with 0.1C/F resolution. Factory set to display in C. User-selectable C or F display.
Alarms	High/low temperature, power failure, door ajar, low battery, probe error; adjustable alarm mute interval (up to 60 min.)
Monitoring	RS-485 port, NO/NC contacts for remote monitoring, alarming
Casters	(4) dual-wheel swiveling casters with (2) toe locks
Insulation	Energy-saving 2.75" (7 cm) thick, CFC-free foam insulation throughout
Lighting	(2) energy-efficient full length LED lights
Refrigeration system	Single top mounted module with 1/3 hp air cooled compressor, non-CFC R-134a refrigerant
Air circulation system	Ducted air through 12 back plenum openings with front face return
Temperature probe	Stainless steel RTD top, immersible; (1) 125 ml product simulation bottle for probes
Electrical	115V, 60Hz, 8.7A, max. circuit/fuse 15A. Hospital-grade NEMA 5-15P, 15A/125V 3-prong plug and 8' (2.4 m) cord.
Voltage range	103-132V
Required clearance	10" (25.4 cm) on top

Accessories – both models

Additional shelves, (2), for REF20-LB (item# 00927251)
Additional shelves, (2), for REF25-LB (item# 00927269)
Medication dispensing system brackets (field-installed) <ul style="list-style-type: none"> Pyxis* bracket (item# 00927202) Omnicell* bracket (item# 00966432) MedDispense* bracket (item# 00978296) McKesson AcuDose-Rx* bracket (no Follett bracket required)
Glycerin, 16 oz (item# 00959296)
Wall anchor kit (CA seismic) (item# 00927194)
Replacement chart paper °F, 7 day, box of 52 (item# 00967729)
Replacement chart paper °C, 7 day, box of 52 (item# 00918821)
Replacement pens, set of 6, red (item# 00918813)

Factory-installed options

Left hinged door
Heated door
Chart recorder, 6" (15 cm)

Pyxis is a registered trademark of Cardinal Health in the United States and other countries.

*Omnicell is a registered trademark of Omnicell, Inc. in the United States.

*MedSelect is a registered trademark of AmerisourceBergen Technology Group, in the United States.

Follett is a registered trademark of Follett Corporation, registered in the US.

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Form #3800
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Selection	
Right Hinge Selection, Factory Ice	
White	46-78972
Stainless	46-78973
Bisque	46-78974
Black	46-78979
Right Hinge Selection, Non-Ice	
White	46-68972
Stainless	46-68973
Bisque	46-68974
Black	46-68979
Interior Capacities	
Total Volume (cu. ft.)	18.2
Refrigerator Volume (cu. ft.)	14.1
Freezer Volume (cu. ft.)	4.1
Refrigerator Features	
Total Interior Shelves	3 Glass
Adjustable Shelves	2
Spill-Proof Shelves	2
Slide-Out Shelves	2
Snack / Deli Drawer	1
Fruit / Vegetable Crisper	2 Humidity-Controlled
Total Door Shelves / Bins	5 (1 Fixed)
Gallon Door Storage	4
Covered Dairy Bin	•
Refrigerator Light(s)	1
Freezer Features	
Factory-Installed Ice Maker (Ice)	•
Optional Ice Maker Kit (Non-Ice)	46-8087
Interior Shelves	1 Full-Width, Adjustable
Freezer Door Shelves / Baskets / Bins	2
Frost-Free	•
General Features	
Up-Front Temperature Controls	Dial
Drawer / Bin Color and Accents	Clear
Door Handles	Reach-Thru
Reversible Doors	•
Textured Steel Doors and Cabinet†	Rounded Doors
ENERGY STAR® Qualified	•
Est. Energy Consumption (kWh / yr.)	383
Est. Yearly Operating Cost*	\$38
Volts / Amps	115 / 4.5
Shipping Weight (Approx. Lbs.)	205
Warranty	
1 Year Limited – Entire Appliance	Parts & Labor

Kenmore 18 cu. ft. Top Freezer, Factory Ice



- 46-78972 – White
- 46-78973 – Stainless
- 46-78974 – Bisque
- 46-78979 – Black

- 2 humidity-controlled crispers
- 3 glass shelves (2 adjustable, spill-proof, slide-out)
- 5 door storage shelves (4 gallon, 1 fixed)
- 1 full-width, adjustable freezer shelf
- 2 freezer door bins
- 29 5/8" W x 66 1/8" H x 31 7/8" D

Kenmore 18 cu. ft. Top Freezer, Non-Ice

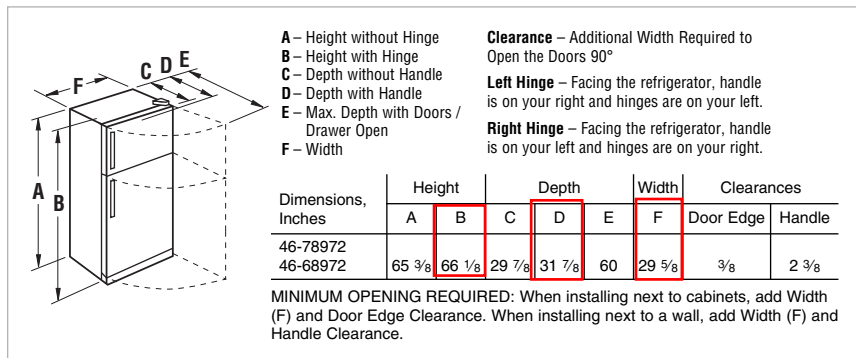
- 46-68972 – White
- 46-68973 – Stainless
- 46-68974 – Bisque
- 46-68979 – Black

- Similar to 46-78972; accepts optional ice maker (kit #46-8087)

If used for other than private family purposes, warranty applies for only 90 days.

†Stainless model doors are smooth finish

*All energy \$ / Yr. figures are calculated at the national average cost of \$0.0906 / kWh. Energy rebates are offered and paid by the energy supplier in states where such programs exist. Criterion is based on percentage of energy efficiency attained beyond the 2006 standard. Dollar amounts may differ.



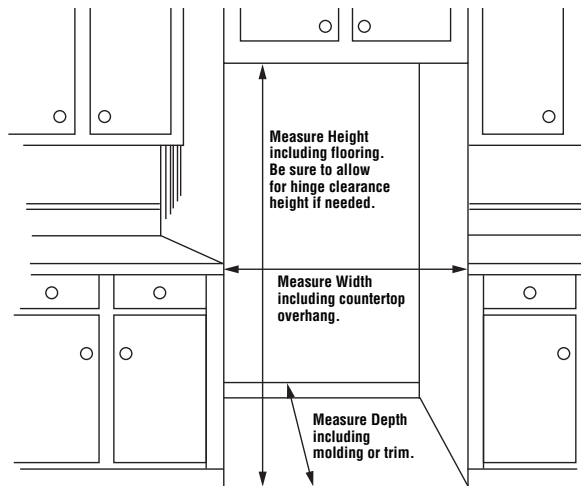


Measure Twice...Order Once

Step by Step Instructions to Assure You Order the Proper Size Refrigerator

It's Just Good Measure To Double Check Before You Order!

1. Measure the opening for the refrigerator. Don't forget baseboards, molding, tile, countertop overhang, etc. If there is an island in your kitchen, be sure there is enough room to open the door.
2. Refer to the chart for the exact dimensions of the refrigerator.
3. IMPORTANT! Calculate the minimum opening required. When installing next to cabinets, you must allow for Door Edge Clearance. (Multiply Door Edge Clearance by 2 for counter depth models.) When installing next to a wall, you must allow for the Handle Clearance.
 Adjacent Cabinet: _____ "F" + _____ Door Edge = _____ Min. Opening
 Adjacent Wall: _____ "F" + _____ Handle = _____ Min. Opening
4. Calculate how much the refrigerator will protrude from cabinetry. If the result is undesired, consider a counter depth model.
 _____ "C" - _____ 24" Cabinet Depth + _____ approx. 2" Electric & Water Connection Clearances = _____ which will Protrude Past Cabinets
5. Measure each door and entry way in the home leading to the kitchen to ensure the refrigerator can be moved through.



REF5P Performance Plus

medical-grade undercounter refrigerator



Solid door standard

Optional glass door

Undercounter refrigerators				
Controls	Keypad	Door configuration	V/Hz/Ph	Item number
LED	No	stainless	115/60/1	REF5P-00-00
		glass	115/60/1	REF5P-00-GD
	Yes	stainless	115/60/1	REF5P-KP-00
		glass	115/60/1	REF5P-KP-GD

Options and accessories

Glass door

Keypad and electronic lock with battery back-up

Extra shelf (item# 01059484)

One drawer kit (item# 01053644)

Two drawer kit (item# 01067750)

External digital data logger (item# 01057561)

Replacement probe for digital data logger (item# 01057595)

Temperature surveillance module (chart recorder) (item# 00168674)

Replacement charts for temperature surveillance module (item# 00162099)

Replacement pens for temperature surveillance module (item# 00162081)

Universal automated medication dispensing system bracket (item# 01059096)

Glycerine (16 oz) (item# 00959296)

Stacking kit – Performance Plus on Performance Plus (item# 01054006)

Stacking kit – Legacy (REF/FZR Series) on Performance Plus (item# 01067172)

Temperature alarm (item# 00112185)

17.00" (43.2 cm) pedestal kit (item# 01059120)

Extra key (item# 01059112)

Casters (set of 4) (item# 01053636)

Seismic bracket kit (item# 01059104)

NO/NC dry contacts for connection to remote alarm systems (item# 01092022)

Features

Superior temperature performance

- custom-designed microprocessor temperature controller
- air-cooled refrigeration system with heavy duty 1/5 horsepower compressor
- environmentally friendly, non-CFC R134a refrigerant
- programmed automatic defrost every 8 hours
- cabinet-wide temperature remains within +/- 1 C (1.8 F), even with frequent door openings

Convenience and security

- fits below 36.00" (91.4 cm) standard countertops without casters
- refrigeration system settings accessed through door-mounted controls
- exterior LED digital temperature display available in user-programmable C or F with choice of product or air temperature
- user-programmable audible and visual high/low alarms
- mechanical lock – mounted on side of door
- lockable controller so set points cannot be inadvertently changed
- flexible internal storage configuration (drawers and shelves interchangeable)
- Agion® antimicrobial and UV product protection added to molded plastic façade¹

Durability and serviceability

- stainless steel construction on exterior and interior
- two epoxy-coated wire shelves standard
- back wall evaporator and front ventilation (no top, back or side clearance required)
- heavy-duty edge-mount self-closing hinges
- field-reversible door
- integral handle and magnetic gasket door closure

Warranty

- 2 year parts and labor on refrigeration system
- 5 year parts on compressor

¹ Disclaimer: Antimicrobial protection is limited to the plastic façade.

Job

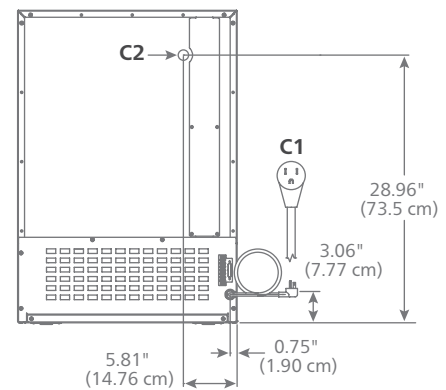
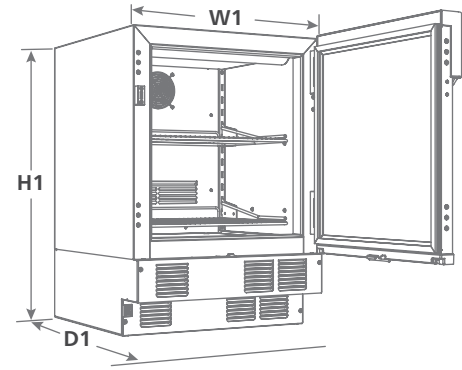
Item

Specification

Nominal capacity	4.5 cu ft (127 L)
W1 Width exterior	23.75" (60.3 cm)
D1 Depth cabinet	25.62" (65.1 cm)
Depth with façade	27.00" (68.6 cm)
H1 Height exterior	34.00" (86.4 cm)
Height with casters	36.50" (92.7 cm)
Width interior	19.75" (50.2 cm)
Depth interior	18.32" (46.5 cm)
Height interior	21.54" (54.7 cm)
Ventilation clearance	0.0" for top, side and back clearance
C1 115 V/60/1 electrical	4.1 run load amps, NEMA 5-15P 90° hospital-grade plug PVC, SJT, 16GA, 7' (2.1 m) cord
Door	solid, foamed stainless 21.50" x 22.51" x 1.63" (54.6 cm x 57.2 cm x 4.0 cm)
Optional glass door	triple pane, low E glass window dimensions 16.30" x 10.90" (41.4 cm x 27.7 cm)
Door lock	cylinder lock
Door handle	molded into front façade
Door hinges	edge-mount, self-closing
Door swing	field-reversible
Storage system	(2) 18.10" x 19.10" (46.0 cm x 48.5 cm) epoxy-coated steel shelves
Gasket	magnetic
Battery back-up on KP (keypad) models only	(8) AA batteries provide power to keypad, electronic lock and controls
Temperature display	standard 7 segment LED
C2 3rd party probe access	rear access port
High and low product temperature alarm	audible and visual, user programmable set points in C or F
Factory set point and operating range	preset at 4 C (40 F) with an adjustable range from 2 C to 10 C (36 F to 50 F)
Probe error alarm	audible and visual — product temperature probes, refrigeration and defrost
Alarm mute	user selectable
Alarm volume	0 -10 adjustable
Min/max temperature log	shows highest and lowest product temperature since last reset occurred
Product simulation bottle	(1) 60 ml
Refrigerant and charge	R134a refrigerant, 9 oz
Energy consumption	1.8 kWh/day
Max heat rejection	2185 BTU/hr
Approximate ship weight	205 lb (93 kg)

NOTE: For indoor use only

Dimensional drawing



SHORT FORM SPECIFICATION: Performance Plus undercounter refrigerator with choice of solid stainless steel or glass door fits under 36.00" (91.4 cm) standard height counter height with 4.5 cubic feet (127 L) of nominal capacity. Includes (2) epoxy-coated wire shelves, adjustable in 1.5" (3.81 cm) increments. Environmentally responsible R134a forced-air cooled refrigeration system. Top-mounted controls display product or air temperature in user-selectable C or F. Integral high and low temperature alarming. Storage area insulated with CFC-free, high-density polyurethane foam. 7' (2.1 m) power cord with NEMA 5-15P 90° hospital-grade plug. NSF, UL and CUL listed.

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REF5P undercounter refrigerator

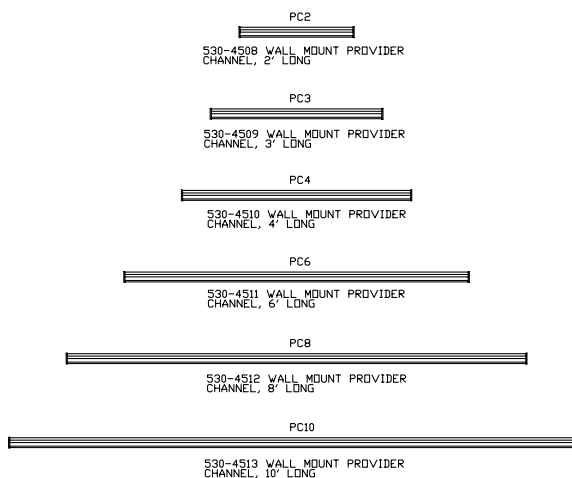
ACCESSORIES

Provider™ Channel System

The Provider™ Channel System is a complete wall mounted equipment storage system. Installed at each patient location, it provides ready access to commonly used equipment such as suction regulators, flowmeters, exam lights, shelves and collection bottles. The channel system accommodates a wide variety of snap-in brackets which interface with various types of equipment. The channel is permanently attached to the wall in the vicinity of the medical gas outlets. The smooth, unobstructed design of the channel facilitates easy cleaning. Each channel includes aluminum mounting bars which are field-attached to the building structure by the customer. These channels are available in a variety of lengths and can be modified in the field due to jobsite conditions, if required.

- Features:**
- Organizes patient area, providing ready access to commonly used equipment.
 - Designed for easy installation.
 - Constructed of attractive, easy-to-clean anodized aluminum.
 - Compatible with our full line of Provider™ accessories.
 - System flexibility accommodates the continually changing needs of healthcare facilities.

DESCRIPTION	STOCK NO.
2' (609mm) Wall Mount Provider™ Channel	530-4508
3' (914mm) Wall Mount Provider™ Channel	530-4509
4' (1219mm) Wall Mount Provider™ Channel	530-4510
6' (1828mm) Wall Mount Provider™ Channel	530-4511
8' (2438mm) Wall Mount Provider™ Channel	530-4512
10' (3048mm) Wall Mount Provider™ Channel	530-4513



Vertical Track System

The Wall Mounted Vertical Track System is a complete wall mounted equipment storage system. Installed at each patient location, it provides ready access to commonly used equipment such as suction regulators, flowmeters, exam lights, shelves, and collection bottles. The track system accommodates a wide variety of snap-in brackets which interface with various accessories. The vertical track is permanently attached to the wall in the vicinity of the medical gas outlets. The smooth, unobstructed design of the track facilitates easy cleaning. Each track includes aluminum mounting bars which are field-attached to the building structure by the customer. The tracks are 8' in length and come as a set of two. The length can be modified in the field due to jobsite conditions, if required.

- Features:**
- Easy access to equipment positioned at bedside.
 - Safe, vertical design eliminates equipment over the bed.
 - Designed for easy installation.
 - Constructed of attractive, easy-to-clean anodized aluminum.
 - Compatible with our full line of Vertical Track accessories.
 - System flexibility accommodates the continually changing needs of healthcare facilities.

DESCRIPTION	STOCK NO.
8' Vertical Track System, Set of 2 - Wall Mounted	530-4522



FOR DESIGN ONLY, NOT FOR CONSTRUCTION

SCALETRONIX

5002 Stand-On Scale

- **Automatic zero.**
- **Weight recall.**
- **Reweigh.**
- **Cordless.**
- **880 lb-400 kg capacity.**

Shown with
optional height gauge.
Wall-mounted
height gauge
also available.



Rear view
of scale showing
rubber wheels.



The 5002 is unique. All other scales require manual zeroing for each weighing by pushing a button or turning a knob. Only Scale-Tronix scales automatically return to zero. You may even turn the 5002 on after the patient is on it and get a correct weight. A paper-tape printer automatically prints out patient weight providing a permanent, accurate record.

The 5002 weighs patients without zeroing in between. It's the only stand-on scale that automatically returns to zero allowing you to weigh a continuous stream of patients. A "Recall" feature retains the last weight reading after the patient has left the scale—until the next patient is weighed. If the patient gets off the scale and you forget the weight, simply press the "Recall" button. The previous weight is displayed and a "Prior Weight" message blinks.

In addition, the press of a button allows reweighing while the patient is still on the scale. An audible signal indicates when a patient's weight is stored in memory.

Our new ergonomic design is perfectly balanced to roll effortlessly. The low-profile platform remains motionless while weighing—provides accurate weight on any floor surface, even carpeting. The handrail is ideal for unsteady patients. Patients may hold the handrail without effecting weight readings.

Power cords have been eliminated. Battery life is typically one year, or approximately 20,000 weighings.

SPECIFICATIONS

5002 Stand-On Scale

Accuracy:	1/10 lb-100 gm.
Weighing Range:	880 lb-400 kg.
Readout:	Digital LED display in pounds and kilograms, or kilograms only.
Power Source-Cordless:	6 D-size disposable batteries. Line cord available on special order.
Automatic Zero:	Automatically returns to zero, ready for next patient.
Weight Recall:	Recalls last weight.
Reweigh:	Recomputes patient's weight while patient is on scale.
Platform:	Low profile 18" X 19 1/2" X 1 1/2", with heavy-duty rubber wheels.
Audible Signal:	Indicates weight reading is entered into memory.
Low Battery Indicator:	Indicates battery needs replacing.
Weighing Mechanism:	Electronic load cells.
Successive Weighing:	Allows weighing a continuous stream of patients without zeroing in between.
Wrap-Around Handrail:	Heavy-duty, stainless steel.
Height Gauge:	(accessory) Stainless steel, in/cm.
Printer:	(accessory) built-in, paper tape, uses standard thermal paper.
Computer Capability:	RS-232 output (optional).



Item # _____

Job _____



SUPER ADJUSTABLE 2™ SUPER ERECTA SHELF®
Adjustable Wire Shelving

SUPER ADJUSTABLE 2™ SUPER ERECTA SHELF® WIRE SHELVING

Super Adjustable 2™ Super Erecta Wire Shelving is the most advanced and innovative wire storage system available. The unique Corner Release System, which allows shelves to be adjusted quickly and easily without tools, has been re-engineered to provide increased rigidity. And Super Adjustable 2™ Shelving works in conjunction with the entire Super Erecta System of shelves and accessories.

- **Maximum Space Utilization:** The Corner Release System encourages repositioning of shelves during initial assembly to reclaim wasted vertical space. In some cases, reclaimed vertical space will allow an extra shelving tier to be added to the storage unit resulting in a 25% increase in storage capacity!
- **Easily Assembled:** The unique Corner Release System enables quick and easy repositioning of shelves during the initial set up to accommodate different package or container sizes. "Total Assembly" is complete only after the shelves are properly spaced to maximize storage. SiteSelect™ Posts, with the double-groove visual guide feature, have circular grooves at 1" (25mm) increments and are numbered at 2" (51mm) intervals to easily identify proper shelf locations.
- **Easily Adjustable:** The unique shelf design and SiteSelect™ Posts enable "tool-free", quick adjustment at 1" (25mm) increments along the entire height of the post.
- **Improved Rigidity:** An enhanced Corner Release System has made Super Adjustable 2™ the most rigid, easily adjustable shelving system ever.
- **Strong:** Super Adjustable 2™ shelves hold as much weight as traditional Super Erecta wire shelving. Stationary units hold a maximum of 2,000 lb. (910kg). Maximum weight capacity per shelf (48" [1219mm] or shorter = 800 lb. [364kg]; longer than 48" [1219mm] = 600 lb. [273kg])
- **Choice of Finishes:** Super Adjustable 2™ Super Erecta shelving is available in a variety of finishes: Super Erecta Brite and chrome-plated for dry storage; Metroseal 3™ with antimicrobial product protection and stainless steel for corrosive environments; and attractive black epoxy for merchandising applications.



Dry Storage — Chrome or Super Erecta Brite™



All Environments — Metroseal 3™ with *Microban® Antimicrobial Product Protection



Mobile Stem Caster Cart



Mobile Dolly Truck

Super Adjustable 2™ Advantage . . .

Easily reposition Super Adjustable 2™ shelves during initial assembly to increase storage capacity by as much as 25%.



Corner Release System

*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.



InterMetro Industries Corporation
North Washington Street
Wilkes-Barre, PA 18705
www.metro.com



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10.01A

SUPER ADJUSTABLE 2™ SUPER ERECTA SHELF® WIRE SHELVING



Dimensions

Super Adjustable 2™ Super Erecta Wire Shelving

Cat. No. Super Erecta Brite	Cat. No. Chrome	Cat. No. Metroseal 3	Cat. No. Stainless	Cat. No. Black	Shelf Width/Length (in.) (mm)	Approx. Pkd. Wt. (lbs.) (kg)
A1424BR	A1424NC	A1424NK3	A1424NS	A1424NBL	14x24 355x610	6 2.7
A1430BR	A1430NC	A1430NK3	A1430NS	A1430NBL	14x30 355x760	7 3.2
A1436BR	A1436NC	A1436NK3	A1436NS	A1436NBL	14x36 355x914	8 3.6
A1442BR	A1442NC	A1442NK3	A1442NS	A1442NBL	14x42 355x1066	9 1/2 4.3
A1448BR	A1448NC	A1448NK3	A1448NS	A1448NBL	14x48 355x1219	10 1/2 4.7
A1460BR	A1460NC	A1460NK3	A1460NS	A1460NBL	14x60 355x1524	14 6.3
A1472BR	A1472NC	A1472NK3	A1472NS	A1472NBL	14x72 355x1825	17 7.7
A1824BR	A1824NC	A1824NK3	A1824NS	A1824NBL	18x24 457x610	7 3.2
A1830BR	A1830NC	A1830NK3	A1830NS	A1830NBL	18x30 457x760	8 3.6
A1836BR	A1836NC	A1836NK3	A1836NS	A1836NBL	18x36 457x914	9 1/2 4.3
A1842BR	A1842NC	A1842NK3	A1842NS	A1842NBL	18x42 457x1066	11 5.0
A1848BR	A1848NC	A1848NK3	A1848NS	A1848NBL	18x48 457x1219	12 5.4
A1854BR	A1854NC	A1854NK3	A1854NS	A1854NBL	18x54 457x1370	14 1/2 6.6
A1860BR	A1860NC	A1860NK3	A1860NS	A1860NBL	18x60 457x1524	17 7.7
A1872BR	A1872NC	A1872NK3	A1872NS	A1872NBL	18x72 457x1825	20 9.1
A2124BR	A2124NC	A2124NK3	A2124NS	A2124NBL	21x24 530x610	8 3.6
A2130BR	A2130NC	A2130NK3	A2130NS	A2130NBL	21x30 530x760	9 4.1
A2136BR	A2136NC	A2136NK3	A2136NS	A2136NBL	21x36 530x914	11 5.0
A2142BR	A2142NC	A2142NK3	A2142NS	A2142NBL	21x42 530x1066	12 5.4
A2148BR	A2148NC	A2148NK3	A2148NS	A2148NBL	21x48 530x1219	14 6.4
A2154BR	A2154NC	A2154NK3	A2154NS	A2154NBL	21x54 530x1370	16 7.3
A2160BR	A2160NC	A2160NK3	A2160NS	A2160NBL	21x60 530x1524	18 8.2
A2172BR	A2172NC	A2172NK3	A2172NS	A2172NBL	21x72 530x1825	24 10.9
A2424BR	A2424NC	A2424NK3	A2424NS	A2424NBL	24x24 610x610	9 4.1
A2430BR	A2430NC	A2430NK3	A2430NS	A2430NBL	24x30 610x760	11 5.0
A2436BR	A2436NC	A2436NK3	A2436NS	A2436NBL	24x36 610x914	13 5.9
A2442BR	A2442NC	A2442NK3	A2442NS	A2442NBL	24x42 610x1066	15 6.8
A2448BR	A2448NC	A2448NK3	A2448NS	A2448NBL	24x48 610x1219	16 7.3
A2454BR	A2454NC	A2454NK3	A2454NS	A2454NBL	24x54 610x1370	18 8.6
A2460BR	A2460NC	A2460NK3	A2460NS	A2460NBL	24x60 610x1524	21 9.5
A2472BR	A2472NC	A2472NK3	A2472NS	A2472NBL	24x72 610x1825	26 11.8
	A3036NC	A3036NK3	A3036NS		30x36 760x914	15 6.8
	A3048NC	A3048NK3	A3048NS		30x48 760x1219	21 9.5
	A3060NC	A3060NK3	A3060NS		30x60 760x1524	26 1/2 11.8
	A3072NC	A3072NK3	A3072NS		30x72 760x1829	31 14.0
	A3636NC	A3636NK3	A3636NS		36x36 910x914	18 8.2
	A3648NC	A3648NK3	A3648NS		36x48 910x1219	23 10.4
	A3660NC	A3660NK3	A3660NS		36x60 910x1524	29 13.1
	A3672NC	A3672NK3	A3672NS		36x72 910x1829	34 1/2 15.4

NOTE: MICROBAN® protects the Metroseal 3 coating from bacteria, mold, mildew and fungi that cause odors, stains and product degradation. For Metroseal 3 shelving information see sheet #10.10A.



Replacement Parts

Each kit includes components for one original Super Adjustable or Super Adjustable 2 shelf; (4) wedges, (4) sleeves, (4) shelf releases.

Cat. No. SAKITA2

SiteSelect™ Posts

STATIONARY					MOBILE†					Approx. Pkd. Wt. (lbs.) (kg)
Height* (in.) (mm)	Cat. No. Plated	Cat. No. Metroseal 3	Cat. No. Stainless	Cat. No. Black	Height* (in.) (mm)	Cat. No. Plated	Cat. No. Metroseal 3	Cat. No. Stainless	Cat. No. Black	
7 1/2	191	7P		7PBL						1/2 0.3
14 1/2	370	13P	13PK3	13PS 13PBL						1 0.5
27 1/2	700	27P		27PS 27PBL	27 1/2	699	27UP		27UPS	1 3/4 0.75
34 1/2	875	33P	33PK3	33PS 33PBL	33 7/8	861	33UP	33UPK3	33UPS 33UPBL	2 0.9
54 9/16	1385	54P	54PK3	54PS 54PBL	54	1370	54UP	54UPK3	54UPS 54UPBL	3 1.4
62 9/16	1590	63P	63PK3	63PS 63PBL	62	1575	63UP	63UPK3	63UPS 63UPBL	3 1/2 1.6
					70	1778		70UPK3		3 3/4 1.7
74 5/8	1895	74P	74PK3	74PS 74PBL	74	1880	74UP	74UPK3	74UPS 74UPBL	4 1.8
86 5/8	2200	86P	86PK3	86PS 86PBL	86	2185	86UP	86UPK3	86UPS 86UPBL	4.5 2.0
96 5/8	2454	**96P								1/2 2.5

*Height includes leveling bolt and cap.

**96P should not be used in units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.

† Post lengths to be specified as cut to a round number, ie: 74P cut to 69"... This will result in an overall post height with adjustment of 69 9/16 to 69 7/8.

‡ Mobile posts come without leveling bolt assembly to accommodate stem casters.

Important: When ordering by components remember that for maximum stability, units should be kept as wide and low as possible.

All Metro Catalog Sheets are available on our Web Site: www.metro.com



InterMetro Industries Corporation

North Washington Street, Wilkes-Barre, PA 18705

Phone: 570-825-2741 • Fax: 570-825-2852

For Product Information Call: 1-800-433-2232

FOR DESIGN ONLY, NOT FOR CONSTRUCTION

L02-006A

Printed in U.S.A. Rev. 1/06

Information and specifications are subject to change without notice. Please confirm at time of order.

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SUPER ADJUSTABLE 2™ SUPER ERECTA SHELF®
Adjustable Wire Shelving

10.01A



SUPER ERECTA SHELF® WIRE SHELVING

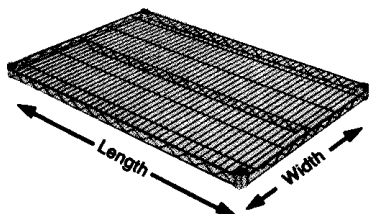
- **Unique Design:** The open wire design of these heavy-gauge carbon-steel or stainless steel shelves minimizes dust accumulation and allows a free circulation of air, greater visibility of stored items and greater light penetration.
- **Versatile Construction:** Super Erecta Shelf® wire shelving can change as quickly as your needs change. By using various accessories, hundreds of shelving configurations become possible.
- **Fast, Secure Assembly:** SiteSelect™ Posts with the triple-groove visual guide feature, have circular grooves at 1" (25mm) intervals and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve (plastic or aluminum) snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
- **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
- **Shelf Accessibility:** Shelves can be loaded/unloaded easily from all sides. This open construction allows use of maximum storage space of cube.
- **Adjustability:** Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
- **Durable:** Super Erecta Shelf® wire shelving is available in four options: Super Erecta Brite™, chrome-plated, stainless steel and Metroseal™.
- **Adjustable Feet:** Bolt levelers compensate for surface irregularities.





SUPER ERECTA SHELF®
WIRE SHELVING

WIRE SHELVES



Split Sleeves

SUPER ERECTA SHELF meets U.S. Government Specifications MIL-S-40144E.

PLATED SHELVING has clear protective coating.

For load capacity guidelines, ask your InterMetro representative for a copy of "Helpful Hints."

	Width		Length		Approx. Pkd. Wt.		Cat. No. Super Erecta Brite	Cat. No. Chrome	Cat. No. Stainless
	(in.)	(mm)	(in.)	(mm)	(lbs.)	(kg)			
14	355	24	610	6	2.7		1424BR	1424NC	1424NS
14	355	30	760	7	3.2		1430BR	1430NC	1430NS
14	355	36	910	8	3.6		1436BR	1436NC	1436NS
14	355	42	1060	9 1/2	4.3		1442BR	1442NC	1442NS
14	355	48	1220	10 1/2	4.7		1448BR	1448NC	1448NS
14	355	60	1525	14	6.3		1460BR	1460NC	1460NS
14	355	72	1825	17	7.7		1472BR	1472NC	1472NS
18	455	24	610	7	3.2		1824BR	1824NC	1824NS
18	455	30	760	8	3.6		1830BR	1830NC	1830NS
18	455	36	910	9 1/2	4.3		1836BR	1836NC	1836NS
18	455	42	1060	11	5.0		1842BR	1842NC	1842NS
18	455	48	1220	12	5.4		1848BR	1848NC	1848NS
18	455	54	1370	14 1/2	6.6		1854BR	1854NC	1854NS
18	455	60	1525	17	7.7		1860BR	1860NC	1860NS
18	455	72	1825	20	9.1		1872BR	1872NC	1872NS
21	530	24	610	8	3.6		2124BR	2124NC	2124NS
21	530	30	760	9	4.1		2130BR	2130NC	2130NS
21	530	36	910	11	5.0		2136BR	2136NC	2136NS
21	530	42	1060	12	5.4		2142BR	2142NC	2142NS
21	530	48	1220	14	6.4		2148BR	2148NC	2148NS
21	530	54	1370	16	7.6		2154BR	2154NC	2154NS
21	530	60	1525	18	8.2		2160BR	2160NC	2160NS
21	530	72	1825	24	10.9		2172BR	2172NC	2172NS
24	610	24	610	9	4.1		2424BR	2424NC	2424NS
24	610	30	760	11	5.0		2430BR	2430NC	2430NS
24	610	36	910	13	5.9		2436BR	2436NC	2436NS
24	610	42	1060	15	6.8		2442BR	2442NC	2442NS
24	610	48	1220	16	7.3		2448BR	2448NC	2448NS
24	610	54	1370	18	8.6		2454BR	2454NC	2454NS
24	610	60	1525	21	9.5		2460BR	2460NC	2460NS
24	610	72	1825	26	11.8		2472BR	2472NC	2472NS

NOTE For Metroseal shelving information see sheet No. 10.10.

"S" Hooks

Used to "add-on" shelving units with only two posts required.
Cat. No. 9995Z

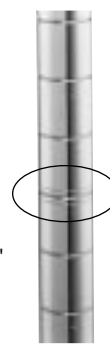


SiteSelect™ Posts

Height*	Approx. Pkd. Wt.		Cat. No. Plated	Cat. No. Stainless
	(in.)	(mm)		
7 5/8	190	1/2	0.2	7P
14 1/2	368	1	0.5	13P 13PS
28 1/2	724	1 3/4	0.75	27P 27PS
34 1/2	876	2	0.9	33P 33PS
54 9/16	1386	3	1.4	54P 54PS
62 9/16	1589	3 1/2	1.6	63P 63PS
74 5/8	1895	4	1.8	74P 74PS
86 5/8	2200	5	2.3	86P 86PS

*Height includes leveling bolt and cap.

SiteSelect™ Posts are grooved at 1" (25mm) increments and numbered at 2" (50mm) increments. Posts are triple-grooved every 8" (203mm) for easy identification.



Important: When ordering by components remember that stability decreases as the ratio of height to width increases. Units should be kept as wide and low as possible. With 14" shelving, foot plates should be used and secured to the floor on free-standing units; on mobile units, maximum post height is 54".

Manufactured by:
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For Product Information, call 1-800-433-2232
For Customer Service, call 1-800-992-1776





Item# _____

Job _____



Standard

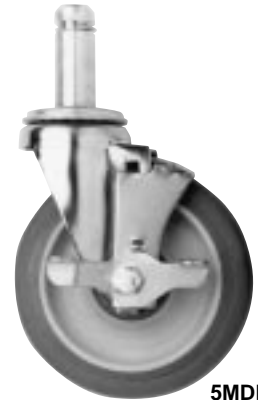


5MB Wheel Brake



5M Resilient

Stainless Steel, Cart Washable



5MDBGSA



5MDGSA

Polymer Casters



5PC



5PCB

METRO™ STEM CASTERS

- **Metro Stem-Type Casters** are designed to fit Super Erecta Shelf® posts to form shelf carts and other mobile units.
- **Stainless Steel, Cart-Washable Casters** offer grease seals and zerk fittings. Can withstand high-pressure washings.
- **Polymer Casters:** Innovative polymer stem casters offer total corrosion resistance and enhanced durability. For all medium-duty applications.
- **Resilient Rubber Tread:** A molded, soft tread that provides good floor protection along with quiet operation. Non-marking.
- **Polyurethane Tread:** Long-wearing; resists abrasion. Non-marking, shock absorbing.
- **Wheel Brakes:** Foot-operated. Available on all caster models.
- **Caster Load Ratings:** From 125 lbs. to 300 lbs. (57 to 136kg).
- **Donut Bumpers:** Furnished standard on all Metro stem casters.
- **Additional Caster Types Available.**

Note: SPECIAL WHEELS — V-groove, Conductive, Steel and Phenolic — are available on request. For additional information, contact InterMetro Industries Corporation or your InterMetro representative.



InterMetro Industries Corporation
North Washington Street
Wilkes-Barre, PA 18705
www.metro.com



METRO™ STEM CASTERS

DIMENSIONS: Standard Casters — Stem-Type

Cat. No.	Type	Wheel Dia.		Face		Wheel Tread	Load Rating		Approx. Pkd. Wt.	
		(in.)	(mm)	(in.)	(mm)		(lbs.)	(kg)	(lbs.)	(kg)
4LD	Stem/Swivel	4	102	1/2	12	Resilient	125	56	1 1/2	.6
5LD	Stem/Swivel	5	127	1/2	12	Resilient	125	56	2	.9
5M	Stem/Swivel	5	127	1 1/4	32	Resilient	200	90	2 1/2	1.1
5MB	Stem/Brake	5	127	1 1/4	32	Resilient	200	90	2 3/4	1.2
5MR	Stem/Rigid	5	127	1 1/4	32	Resilient	200	90	3 1/2	1.5
5MDA	Stem/Swivel	5	127	1 1/4	32	High Modulus Donut	250	111	2 1/2	1.1
5MDBA	Stem/Brake	5	127	1 1/4	32	High Modulus Donut	250	111	2 5/8	1.17
5MDRA	Stem/Rigid	5	127	1 1/4	32	High Modulus Donut	250	111	2 5/8	1.08
5MP	Stem/Swivel	5	127	1 1/4	32	Polyurethane	300	135	2 1/8	.94
5MPB	Stem/Brake	5	127	1 1/4	32	Polyurethane	300	135	2 1/4	1
5MPR	Stem/Rigid	5	127	1 1/4	32	Polyurethane	300	135	2	.9

NOTE 1: Stem casters are shipped with donut bumper **at no additional charge.**

NOTE 2: Rigid casters are held in position by a connecting channel. When ordering rigid casters, shelf width must be known.

NOTE 3: Load Height for all 5M, 5MD and 5MP casters — 6 7/32" ± 1/16" (155 ± 1.5mm).

NOTE 4: Load Height for 4LD caster — 4 5/8" ± 1/16" (118 ± 1.5mm).

NOTE 5: Load Height for 5LD caster — 5 5/8" ± 1/16" (143 ± 1.5mm).

NOTE 6: Brakes are foot-operated.

DIMENSIONS: Stainless Steel Cart-Washable Casters — Stem-Type

Cat. No.	Type	Wheel Dia.		Face		Wheel Tread	Load Rating		Approx. Pkd. Wt.	
		(in.)	(mm)	(in.)	(mm)		(lbs.)	(kg)	(lbs.)	(kg)
5MDGSA	Swivel	5	127	1 1/4	32	High Modulus Donut	150	68	2 1/2	1.1
5MDBGSA	Brake	5	127	1 1/4	32	High Modulus Donut	150	68	2 5/8	1.17
5MDRGSA	Rigid	5	127	1 1/4	32	High Modulus Donut	150	68	2 5/8	1.08
5MPGSA	Swivel	5	127	1 1/4	32	Polyurethane	300	135	2 1/8	.94
5MPBGSA	Brake	5	127	1 1/4	32	Polyurethane	300	135	2 1/4	1
5MPRGSA	Rigid	5	127	1 1/4	32	Polyurethane	300	135	2	.9

NOTE 1: Stem casters are shipped with donut bumper **at no extra charge.**

NOTE 2: Rigid casters are held in position by a connecting channel. When ordering rigid casters, shelf width must be known.

NOTE 3: Load Height for all 5MD and 5MP casters — 6 7/32" ± 1/16" (155 ± 1.5mm).

NOTE 4: All casters are grease sealed with zerk fittings in swivel and axle.

NOTE 5: Brakes are foot-operated.

NOTE 6: "D" in model number designates donut wheel made of high-modulus rubber.

DIMENSIONS: Polymer Casters — Stem-Type

Cat. No.	Type	Wheel Dia.		Face		Wheel Tread	Load Rating		Approx. Pkd. Wt.	
		(in.)	(mm)	(in.)	(mm)		(lbs.)	(kg)	(lbs.)	(kg)
5PC	Swivel	5	127	1 1/4	32	Polyurethane	300	135	2	.9
5PCB	Brake	5	127	1 1/4	32	Polyurethane	300	135	2	.9
5PCR	Rigid	5	127	1 1/4	32	Polyurethane	300	135	2	.9

NOTE 1: Optional thread guards (blue) may be ordered by adding "-TG" to the desired model number (eg. 5PC-TG, 5PCB-TG, 5PCR-TG)

NOTE 2: Stem casters are shipped with donut bumpers **at no extra charge.**

NOTE 3: Rigid casters are held in place by a connecting channel. When ordering, shelf depth **must be** provided.

Manufactured by:
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 Wilkes-Barre, PA 18705

www.metro.com

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 Rev. 9/98 BJ
 Printed in U.S.A.
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Meese Orbitron Dunne Product Specification Sheet

6/12



90P POLY-TRUX[®]

Visit : www.modroto.com

Dimensions

48" L X 28 1/2" W "X 64" O.A.H

Shipping weight (150) lbs for a standard part only

Inside Depth 54" 38 cu.ft 32 Bushel

(2) side by side in a standard trailer (42) upright
+ (18) more stacked on top for a total of (60)
per trailer.

Load Capacity : 800 lbs

Standard Features:

(2) Removable wire shelves with shelf bar for the
bottom and (2) " L" hooks for the top shelf

Molded durable plastic base

Torque resistant molded-in inserts

Drain holes in the bottom

6" X 2" Gray rubber casters (COLSON)

Available Options:(May affect shipping weight)

Black powder coated steel base

Removable slotted plastic shelves

Non-removable wire shelves

Cardholder

Customized Logo plate 3" X 4" on side

8" X 2" Gray rubber caster (COLSON)

Hand holes

Recessed tow-hitch

Recessed handle on one side or both sides

Cart cover

Stenciling



90P Standard



90P Plastic shelves



Oster® 2-Slice Digital Countdown Toaster, Brushed Stainless

Product No. TSSTRTS2S2



Specifications

Dimensions

Product Depth (in.)	8.3	Product Width (in.)	13.2
Product Height (in.)	9.6		

Details

Appliance Type	Toaster	Reconditioned	No
Color/Finish	Brushed Stainless Steel	Returnable	90-Day
Color/Finish Family	Stainless	Size Of Toasting Slots	Extra-wide
Cool-Touch Exterior	No	Slices Of Bread	2
Dishwasher Safe Parts	Yes	Slide-Out Crumb Tray	Yes
Number of Temperature/Cooking Controls	7	Wattage (watts)	750
Product Weight (lb.)	4.3 lb		

Seismic Channel

PRODUCT DETAILS

19" / 48.3 cm Channel

WC-0002-05

- Seismic channel
- Includes mounting hardware and instructions
- OSHPD Pre-Approval: WC-0002-03, -05, -07, -09, -11, and -15.

FOR PHILIPS MX450 MONITORS



Installation Guide

GCX Wall Channel Installation Guide for Seismic and Non-Seismic Applications



Warnings

- Installation must be performed by Qualified Personnel. Failure to follow these Instructions may result in serious injury.
- Instructions and the illustrations covering the specific instrument to be mounted should be reviewed prior to Installation of Wall Channel.
- It shall be the responsibility of the hospital, its consultants and/or contractors to determine that the wall is adequate to safely mount instrumentation. This includes the selection of appropriate fasteners and the proper installation of the same.
In new construction and remodeling work where the wall covering can be entirely or partly removed, a 16-gauge steel stud/plate or a 2" X 6" Douglas Fir #2 stud should be located for the purpose of attaching the Wall Channel. The following is provided as guideline information only.
- Do not substitute or omit fasteners.
- Do not position any mounts or related hardware above a patient.
- Allow clearance on either side of the Channel centerline to clear objects such as over-bed lighting, privacy curtains, adjacent walls or columns, door swing arcs, etc. Power and signal outlets should be considered when selecting a channel location. Avoid oxygen, vacuum and air outlets.
- Ensure that the weight being mounted does not exceed Load Ratings:
OSHPD Pre-Approval compliance: M Series arms = 60 lbs (27.2 kg), VHM arms = 40 lbs (18.1 kg) VHM-25 arms = 20 lbs (9.1 kg) or 16 lbs (7.2kg) MAX LOAD RATING. Over 60 lbs (27.2 kg): Not OSHPD Pre-Approved.
Refer to our website, www.gcx.com/support, to obtain the latest available OSHPD documentation.
- Although considerable effort has been made to ensure the safety of the above installation and/or Guidelines, the actual wall construction materials and installation itself is beyond the control of GCX Corporation. Accordingly, GCX Corporation is not responsible for the failure of any such installations.

OSHPD

The GCX 13" (33 cm), 19" (48.3 cm), 25" (63.5 cm), 31" (79 cm), 37" (94 cm) and 49" (124.4 cm) Seismic Channels conform to the California Office of Statewide Health Planning and Development (OSHPD) Seismic Preapproval requirements. **Refer to our website, www.gcx.com/support, to obtain the latest available documentation.**

Locating the Wall Channel

Note: Devices and Wall Mounts may require channel placement outside of these guidelines. Access to device controls, ergonomic requirements, and the "range of motion" the Mount provides should be considered before mounting the Wall Channel.

Displays and Patient Monitors: The bottom edge of a 19" (48.3 cm) Wall Channel is placed 54" (142.2 cm) above the floor, plus or minus 4" (10.2 cm).

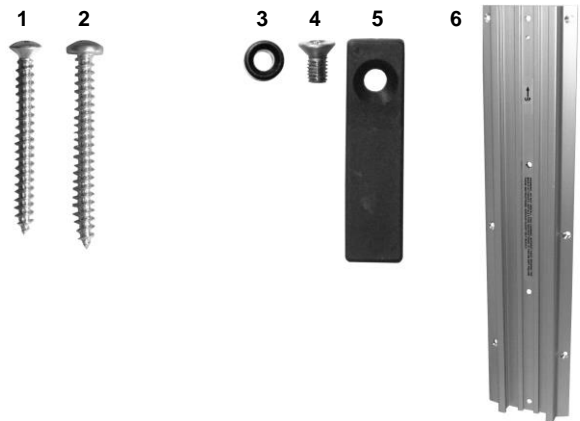
Computer Workstations: When mounting a computer workstation with a VHM Series Arm, the bottom edge of a 19" (48.3 cm) Wall Channel is placed 37.5" (95.2 cm) above the floor. When using M Series Arms, the bottom edge of the 19" (48.3 cm) Wall Channel is placed 26.5" (67.3 cm) above the floor.

Seismic Wall Channel

The following Wall Channel parts reference chart lists hardware quantities for the 19" (48.3 cm) Seismic Wall Channel. Longer channels are available and include hardware for the additional mounting points.

Seismic Wall Channel Parts Reference

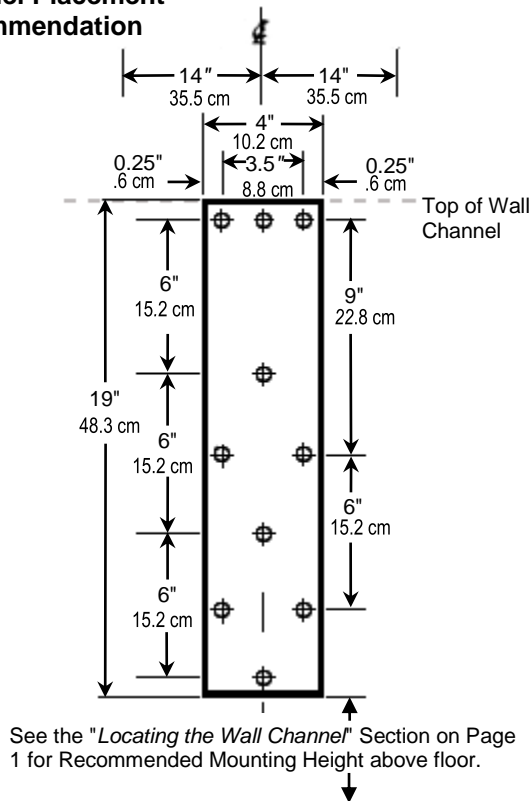
Item #	Description	Qty
1	#10 x 2" Oval Head Sheet Metal Screw (OHSMS)	7
2	#10 x 2" Pan Head Sheet Metal Screw (PHSMS)	3
3	Fixed Channel Stop	1
4	10-32 x 3/8" Flat Head Machine Screw (FHMS)	1
5	Depressible Channel Stop	1
6	Seismic Wall Channel	1



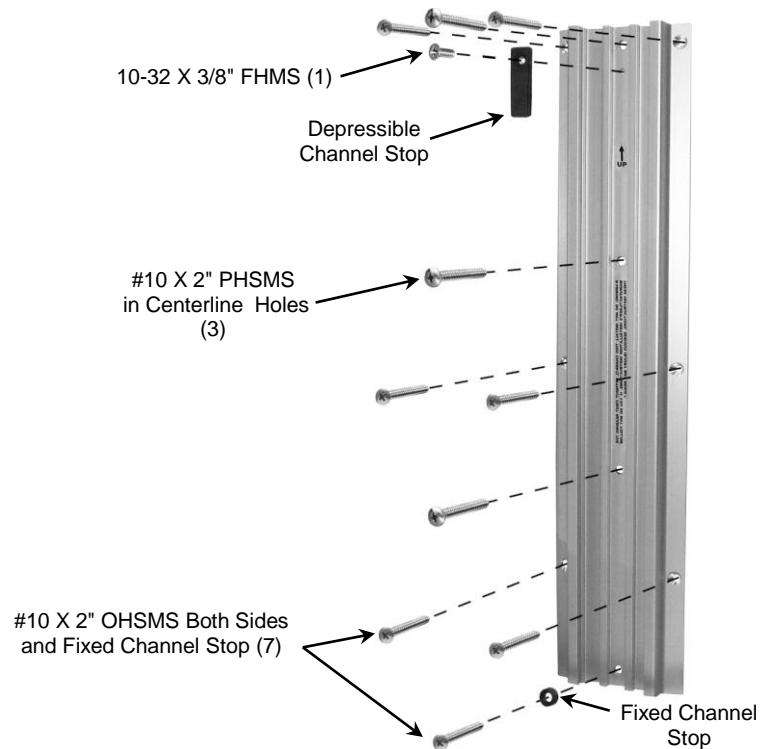
Installing Seismic Wall Channel

Drill all screw holes in the 16-gauge or Douglas Fir anchorage using a 9/64" diameter twist drill bit for the #10 x 2" type "A" sheet metal screws supplied. Do not substitute screws. Install the top, centerline screw first. Level the channel and mark for the remaining 9 screws. The (3) Pan Head Screws are used in the 3 centerline holes. The bottom Fixed Stop, and all others holes use Oval Head Screws. Screws should be started and driven with ball handle drivers or torque limiting screw guns not exceeding 60 inch-pounds (6.7 Nm).

Channel Placement Recommendation



Hardware Placement

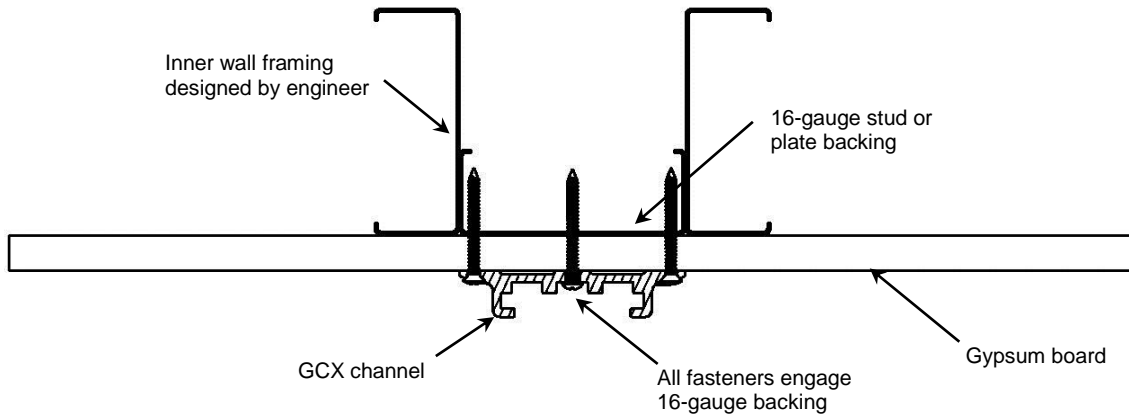


Seismic Wall Channel Support Backing Methods

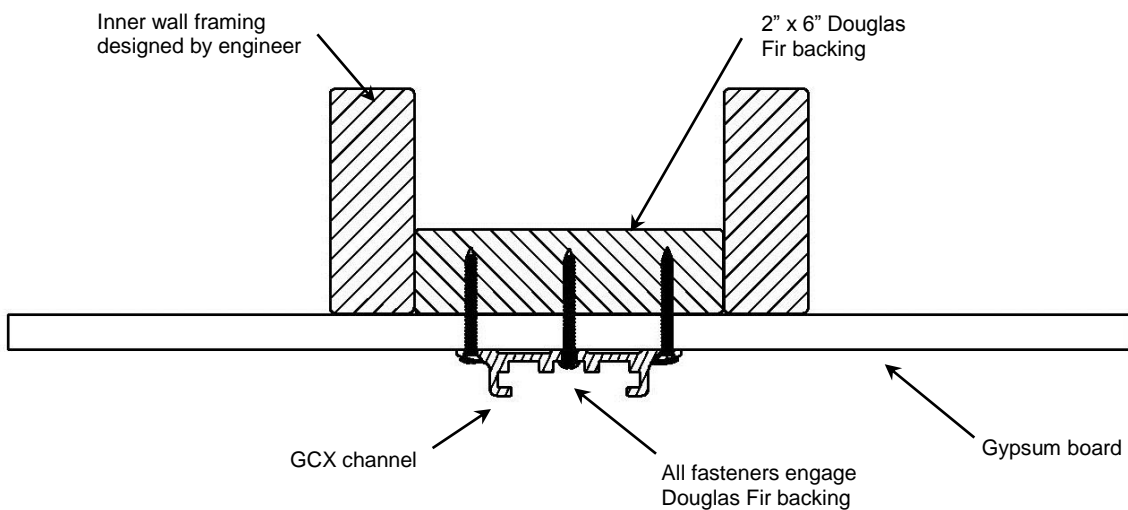
The recommended two inner wall backing materials and methods are: 16-gauge stud or plate for steel framed walls, or 2" x 6" solid Douglas Fir blocking for wood framed walls. **Note: the inner wall framing structure needs to be designed and verified by the structural engineer of record to support the applied weights and forces on wall.**

METHODS OF SUPPORT BACKING

Steel stud walls



Wood stud walls



Standard Wall Channel

The following Wall Channel parts reference chart lists hardware quantities for 19" (48.3 cm) Standard Wall Channel. Longer channels are available and include hardware for the additional mounting points.

Standard Wall Channel Part Reference

Item #	Description	Qty
1	#12 x 2 3/4" Sheet Metal Screw (SMS)	4
2	1/4-20 x 3" Pan Head Machine Screw w/Toggle Wings	4
3	Fixed Channel Stop	1
4	10-32 x 3/8" Flat Head Machine Screw (FHMS)	1
5	Depressible Channel Stop	1
6	Standard Wall Channel	1



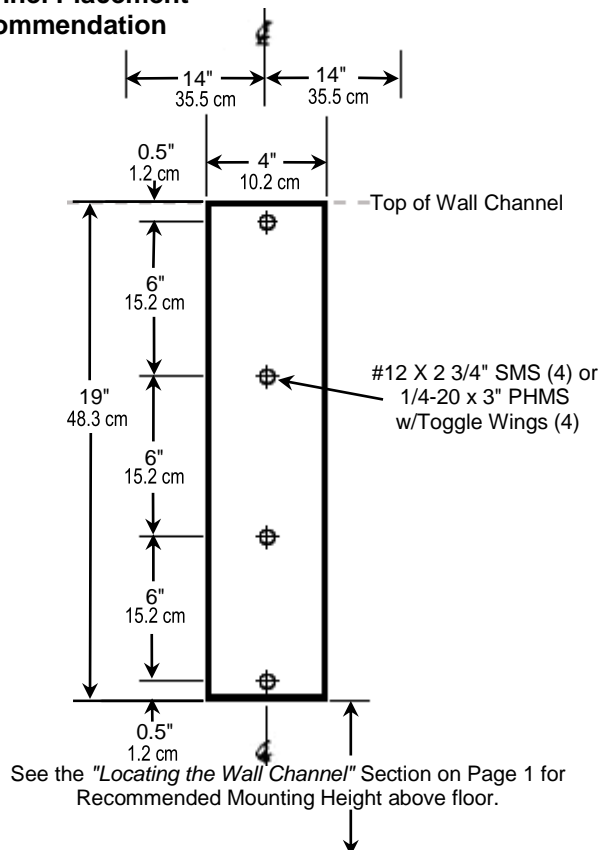
Installing the Standard Wall Channel

Drill 11/64" (17 mm) diameter holes for #12 X 2-3/4" high tensile Philips Head Screws. Install the top screw and level the channel, then mark and drill the other holes. Screws should be started and driven with ball handle drivers or torque limiting screw guns not exceeding 60 inch-pounds (6.7 Nm). Screws must pass through Channel, drywall, and fully engage with wood stud or 16-gauge steel stud.

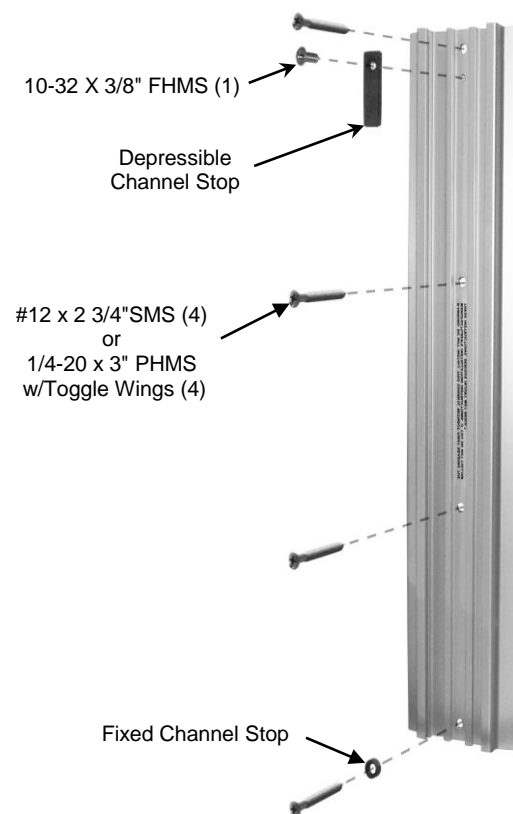
Drill 3/4" (19.5 mm) diameter holes for the 1/4-20 x 3" Pan Head Machine Screws with Toggle Wings. Toggle wings should be used if steel wall stud is less than 16-gauge in thickness.

Installation Note: Seismic Wall Channel can be installed in the same manner as a Standard Wall Channel when OSHPD approval is not required.

Channel Placement Recommendation

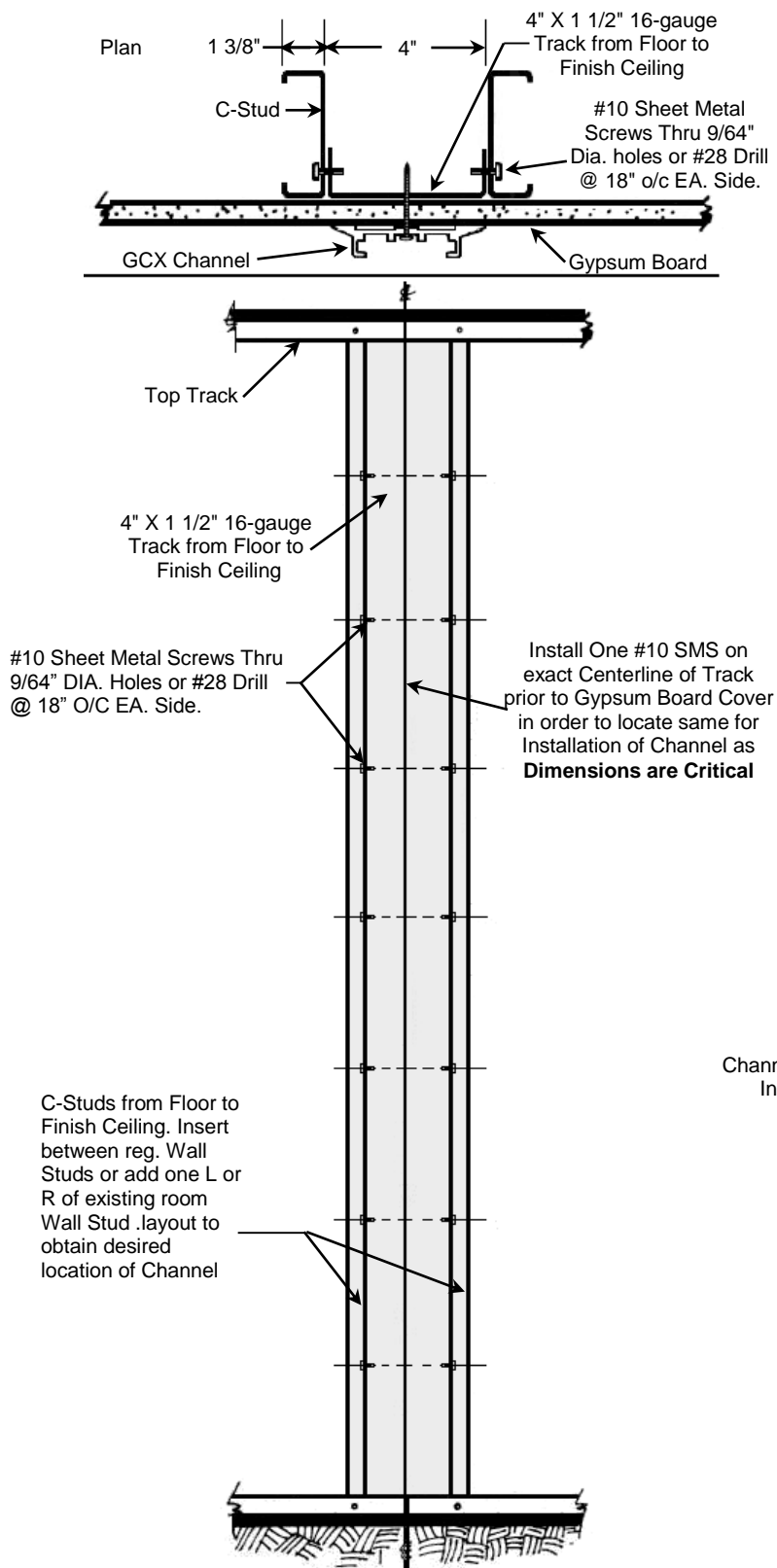


Hardware Placement



Method-A

Standard



This anchorage will allow for a quick and simple installation of the Standard Wall Channel. 16-gauge steel will prevent the material from extruding up the shank of the screw (Stripping). 11/64" diameter holes are required for #12 X 2-3/4" High Tensile, Phillips Head Screws (4) installed down the Centerline (Non-Seismic Applications).

A second Track can be used for back-to-back Installations. A 2" X 4" wood stud may be used if allowed by local building codes.

Drywall (Gypsum Board) over 16-Gauge Sheet Metal or Wood Studs:

Locate the exact centerline of the stud. Drive a #4 finishing nail through the drywall to contact the stud. Withdraw and drive again 3/8" (9.5 mm) right and left until the edges of the stud have been located and hence the centerline determined. The Wall Channel's 4 inch (10.2 cm) width will cover these exploratory holes.

Drill 11/64" (17 mm) diameter holes for #12 X 2-3/4" high tensile Philips head screws in a single 16-gauge stud through Channel Centerline, (4 places). Install the top screw and level the channel, then mark and drill the other holes.

Drywall (Gypsum Board) over Sheet Metal Studs less than 16-Gauge:

Locate the centerline of the stud per the above instructions. Use 1/4-20 X 3" Pan Head Machine Screws and Toggle Wings. Drill 3/4" (19.5 mm) diameter holes with a sharp speed bore or twist drill (requires pilot hole). Note that the round stop at the bottom of the channel goes over the shank of the bottom screw. Insert screws through Wall Channel holes then affix the toggle wings to the screws. Insert toggle wings into previously drilled holes. Use a level to make sure the channel is vertical prior to final seating of the screws.

Plaster Coat over Expanded Metal Lath on Steel Studs, Hollow Tile, Hollow Block:

Drill 3/4" (19.5 mm) holes. Insert screws through Wall Channel holes then affix the toggle wings to the screws. Insert toggle wings into previously drilled holes. Use a level to make sure the channel is vertical prior to final seating of the screws.

Concrete Walls:

Refer to Structural Engineer.

Through Wall, Back to Back Installations:

Sufficient length 1/4-20 machine screws, nuts, washers and/or back plates must be obtained to mount the channel by drilling all the way through the partition wall. A Portalign drill fixture is recommended for this procedure.

Special Applications:

Channels can be attached to a GCX 4" X 4" (10.2 x 10.2 cm), 1/8" (3.2 mm) wall aluminum support column or certain mullions, etc.. Contact GCX to discuss solutions to mounting concerns for any situation not covered by these guidelines.

SECTION 12 24 13

ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Manually operated sunscreen roller shades.
 - 2. Manually operated dual roller sunscreen and light blocking shades.

- B. Sustainable Building Requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

- C. Related Sections include the following:
 - 1. Section 01 23 00 "Alternates" for bidding Alternates.
 - 2. Section 01 43 39 "Room Mockup Requirements" for room mockups.
 - 3. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 4. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 5. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
 - 6. Division 09 Section "Non-Structural Metal Framing" for metal blocking and grounds for mounting roller shades and accessories.
 - 7. Division 26 Sections for requirements for electrical service and connections for motor operators, controls, limit switches, and other powered devices and for system disconnect switches for motorized shade operation.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.

- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS -

LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.
- D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 1. Ceiling suspension system members and attachment to building structure.
 2. Ceiling-mounted or penetrating items including light fixtures, air outlets and inlets, speakers, sprinklers, recessed shades, and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
 3. Shade mounting assembly and attachment.
 4. Minimum Drawing Scale: 1/8 inch = 1 foot.
- E. Samples for Verification:

1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated.
2. For the following products:
 - a. Shade Material: Not less than 12-inch- square section of fabric, from dye lot used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of material.
 - b. Valance: Full-size unit, not less than 12 inches long.
- F. Window Treatment Schedule: For roller shades. Use same designations indicated on Drawings.
- G. Product Certificates: For each type of roller shade, signed by product manufacturer.
- H. Qualification Data: For Installer.
- I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of roller shade.
- J. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
 1. Methods for maintaining roller shades and finishes.
 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 3. Operating hardware.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products, or an installer trained and certified by the Manufacturer to install the specified products.
- B. Source Limitations: Obtain roller shades through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 1. Flame-Resistance Ratings: Passes NFPA 701.
 2. Class A, Flame-Spread Index: 25 or less, Smoke-Developed Index: 450 or less, per ASTM E84.
- D. Product Standard: Provide roller shades complying with WCMA A 100.1.
- E. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Provide roller window shades for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.

- a. See Section 01 43 39 "Room Mockup Requirements" for room mockups requiring roller window shades.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 WARRANTY

- A. Roller Shade Hardware, Chain and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.
- B. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five-year warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, lead-free designation, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Rollers Shades: Before installation begins, for each size, color, texture, and pattern indicated, full-size units equal to 5 percent of amount installed.

PART 2 - PRODUCTS

2.1 PRODUCT

- A. Manufacturer/Product: Subject to compliance with requirements, provide Draper Clutch FlexShade XD.
- B. Alternate Manufacturer/Product: Subject to compliance with requirements, provide Altex Sunproject Line Moduline 85/105 Lite Lift.

2.2 ROLLER SHADES

- A. Shade Band Material:
1. Sunscreen Fabric: PVC-free, as indicated in the Materials Legend, on the Drawings, or if not indicated, as selected by the Architect.
 2. Light Blocking Fabric: PVC-Free, as indicated in the Materials Legend, on the Drawings or if not indicated, as selected by the Architect.
 3. Bottom Hem: Straight.
- B. Rollers: Extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with removable spline fitting integral channel in tube for attaching shade material. Provide capacity for two roller shade band(s) per roller, unless otherwise indicated.
- C. Direction of Roll: Regular, from back of roller.
- D. Mounting Brackets: Galvanized or zinc-plated steel.
- E. Pocket with Ceiling Slot Opening: Six-sided box units for recessed installation; fabricated from formed-steel sheet, extruded aluminum, with a bottom consisting of slot opening of minimum dimension to allow lowering and raising of shade and a removable or an openable, continuous metal access panel concealing rollers, brackets, and operating hardware and operators within; capacity for two roller shades overlapping in staggered pattern, front and back per pocket.
1. Corner Section: Factory formed and welded.
 2. Ceiling support leg on room side, finished to match bottom cover.
 - a. Closure mount with tile support.
 3. Bottom consisting of slot opening of minimum dimension and continuous metal access panel concealing rollers, brackets, and operating hardware and operators.
 - a. Finish: Color coated.
 - b. Color: As selected by Architect from Manufacturer's standard colors.
- F. Dual Roller Pocket with Ceiling Slot Opening: Six-sided box units for recessed installation; fabricated from formed-steel sheet, extruded aluminum, with a bottom consisting of slot opening of minimum dimension to allow lowering and raising of shade and a removable or an openable, continuous metal access panel concealing rollers, brackets, and operating hardware and operators within; capacity for two roller shades overlapping in staggered pattern, front and back per pocket.
1. Corner Section: Factory formed and welded.
 2. Ceiling support leg on room side, finished to match bottom cover.
 - a. Closure mount with tile support.
 3. Bottom consisting of slot opening of minimum dimension and continuous metal access panel concealing rollers, brackets, and operating hardware and operators.
 - a. Finish: Color coated.
 - b. Color: As selected by Architect from Manufacturer's standard colors.

- G. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure. Provide where indicated.
 - 1. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than dimensions indicated on Drawings.
 - 2. Endcap Covers: To cover exposed endcaps.
- H. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - 1. Shape: L-shaped.
 - 2. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 3 inches (76 mm).
- I. Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide concealed, by pocket of shade material, internal-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.
- J. Light-Blocking Shades: Provide at Dual Roller Shade and where indicated, Designed for limiting visible light gaps when shades are fully closed; fabricated from blackout shade band material with standard pocket and bottom bar.
 - 1. Side Channels, Sill Channel or Angle, and Perimeter Seals: NONE.
- K. Mounting: As indicated on Drawings, mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.
- L. Shade Operation: Manual; with continuous-loop bead-chain, clutch, and cord tensioner and bracket lift operator.
 - 1. Position of Clutch Operator: As indicated.
 - 2. Clutch: Capacity to lift size and weight of shade; sized to fit roller or provide adaptor.
 - 3. Lift-Assist Mechanism: Manufacturer's standard spring assist for balancing roller shade weight and lifting heavy roller shades.
 - 4. Loop Length: Length required to make operation convenient from floor level.
 - 5. Bead Chain: Stainless steel.
 - a. Chain-Retainer Type: Clip, jamb mount.
 - 6. Operating Function: Stop and hold shade at any position in ascending or descending travel.

2.3 ROLLER SHADE FABRICATION

- A. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.
- B. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
 - 1. Lifting Mechanism: With permanently lubricated moving parts.
- C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Shade Units Installed between (Inside) Jambs: Edge of shade not more than 1/4 inch from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.
 2. Shade Units Installed Outside Jambs: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- D. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting headbox, roller, and operating hardware and for hardware position and shade mounting method indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.
- F. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.
- G. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades. Refer to Division 01 Section "Demonstration and Training."

3.6 ROLLER WINDOW SHADE SCHEDULE

- A. Base bid single roller.
- B. Alternate 2, Dual Roller Shades (by base bid Manufacturer).
- C. Alternate 3, Roller Shads by Alternate Manufacturer.
- D. Alternate 4, Dual Roller Shades by Alternate Manufacturer.

END OF SECTION

SECTION 12 36 23

PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Plastic-laminate countertops.
- B. Sustainable design requirements:
1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections:
1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 3. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood support of Plastic-Laminated-Clad Countertops.
 4. Section 12 32 16 "Plastic Laminate Faced Manufactured Casework" for cabinets supporting countertops and plastic laminate materials schedule.
 5. Section 12 36 61 "Simulated Stone Countertops" for simulated stone countertops.
 6. Division 22 for Plumbing Fixtures, sinks and plumbing fittings.

1.2 ACTION SUBMITTALS

- A. Coordination: Submit related shop drawings, specified in another Section simultaneously for approval.
1. Cabinet shops, showing all dimensions and indicating how countertops are to be mounted to cabinets.
- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Composite Wood Products.
 - 4) Ceilings, Walls, Thermal and Acoustical Insulation products.
 - C. Product Data: For each type of product, including panel products high-pressure decorative laminate and adhesive for bonding plastic laminate.
 - D. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 1. Show locations and sizes of cutouts and holes for plumbing fixtures faucets soap dispensers electrical switches and outlets and other items installed in plastic-laminate countertops.
 - E. Samples for Verification:
 1. Plastic laminates, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.
 2. Wood-grain plastic laminates, 12 by 24 inches (300 by 600 mm), for each type, pattern and surface finish, with one sample applied to core material and specified edge material applied to one edge.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For fabricator.

- B. Product Certificates: For the following:
 - 1. Composite wood products.
 - 2. High-pressure decorative laminate.
 - 3. Chemical-resistant, high-pressure decorative laminate.
 - 4. Adhesives.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of countertops that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of components or other failures of glue bond.
 - b. Warping of components.
 - 2. Warranty Period: Five years from date of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver countertops until painting and similar operations that could damage countertops have been completed in installation areas. If countertops must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.
 - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
- B. Grade: Custom.
- C. LEED Requirements:
 - 1. Certified Wood: Plastic-laminate countertops shall be made from wood products certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and FSC STD-40-004, "FSC Standard for Chain of Custody Certification."
 - 2. Composite Wood Products: Comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - 3. Provide plastic laminate products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
 - 4. Provide plastic laminate products with Greenguard Gold Certification.
- D. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.
 - 1. Basis for Design Manufacturers: Subject to compliance with requirements, provide products by Nevamar, or visually identical products by one of the following:
 - a. Abet Laminati, Inc.
 - b. Formica Corporation.
 - c. Lamin-Art, Inc.
 - d. Nevamar Company, LLC; Decorative Products Div.
 - e. Panolam Industries International, Inc.
 - f. Wilsonart International; Div. of Premark International, Inc.
 - 2. Color and texture: Nevamar; WM0046T textured.
- E. Edge Treatment: Self edge, unless otherwise indicated.
- F. Edge Treatment: Hardwood edge where indicated.
- G. Core Material: Particleboard made with exterior glue and containing no urea formaldehyde.
 - 1. See Section 06 41 13 Plastic-Laminate Faced Architectural Cabinets" for core requirements.
- H. Core Thickness: As indicated.
- I. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.

2.2 WOOD MATERIALS

- A. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Recycled Content of Medium-Density Fiberboard and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 100 percent.
 2. Composite Wood Products: Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 3. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.

2.3 ACCESSORIES

- A. Grommets for Cable Passage through Countertops: 2 inch (51-mm) OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
1. Product: Subject to compliance with requirements, provide "[OG] [SG] series" by Doug Mockett & Company, Inc.

2.4 MISCELLANEOUS MATERIALS

- A. Adhesives:
1. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: 30 g/L.
 - b. Multipurpose Construction Adhesives: 70 g/L.
 - c. Structural Wood Member Adhesive: 140 g/L.
 - d. Architectural Sealants: 250 g/L.
- B. Do not use adhesives that contain urea formaldehyde.
1. Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.5 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening

devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
 - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.
 - 2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
 - 1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400 mm) sag, bow, or other variation from a straight line.
 - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c. and to walls with adhesive.
 - 3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant; see Section 07 92 00 Joint Sealants, Joint-Sealant Application [JS-3].

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

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SECTION 12 36 61

SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-surface-material countertops and backsplashes.
2. Quartz agglomerate countertops and backsplashes.

B. Sustainable Building Requirements:

1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

C. Related Sections:

1. Section 01 43 39 "Room Mockup Requirements" for room mockups.
2. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
3. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
4. Section 06 41 13 "Wood-Veneer-Faced Architectural Cabinets" for cabinets supporting countertops.
5. Section 06 41 16 "Plastic-Laminate-Clad Architectural Cabinets" for cabinets supporting countertops.
6. Division 22 for Plumbing Fixtures, sinks and plumbing fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For each product indicated.

B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:

1. LEED Product Submittals.
2. LEED Credit-Specific Submittals for the following LEED v4 credits:

- a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- D. Samples for Verification: For the following products:
 1. Solid-surface-material, 6 inches square.
 2. Quartz agglomerate solid-surface-material, 6 inches square.
 3. Backsplash, 6 inches long.
 4. Sink. Will be returned for use in the Project.
- 1.3 QUALITY ASSURANCE
- A. Mockups: Provide simulated stone countertops for mockups of assemblies specified in other Sections. Use materials and installation methods specified in this Section.
 1. See Section 01 43 39 “Room Mockup Requirements” for room mockups requiring simulated stone countertops.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.4 PROJECT CONDITIONS
- A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.5 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. LEED Requirements: Provide solid-surfacing and quartz agglomerate products with third party certified Type III industry-wide (generic) or product-specific Environmental Product Declarations (EPDs).
- B. LEED Requirements: Provide solid-surfacing and quartz agglomerate products with manufacturer's product-specific Health Product Declarations (HPDs).

2.2 SOLID-SURFACE-MATERIAL COUNTERTOPS

- A. Configuration: Provide countertops with the following front and backsplash style:
 - 1. Front: Custom edge details, as shown on the Drawings.
 - a. Raised Marine Edge.
 - b. Tapered and radiused edge.
 - c. Other custom edge detail indicated.
 - 2. Backsplash: Integral with countertop, radius edge with 3/8-inch (9.5-mm) radius.
 - 3. Endsplash: Matching backsplash.
- B. Countertops [**SSM 01**]: 3/4-inch- thick, solid surface material with front edge built up with same material.
 - 1. Color and pattern: As indicated in the Materials Legend, on the Drawings, or as selected by the Architect from Industry standard colors and patterns.
- C. Backsplashes: 3/4-inch- thick, solid surface material.
- D. Fabrication: Fabricate tops in one piece with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 1. Install integral sink bowls in countertops in the shop.

2.3 QUARTZ AGGLOMERATE COUNTERTOPS

- A. Configuration: Provide countertops with the following front and backsplash style:
 - 1. Front: Straight, slightly eased at top, built up to thickness indicated.
 - 2. Backsplash: Straight, slightly eased at corner.
 - 3. Endsplash: Matching backsplash.
- B. Countertops [**SSM-02**]: 2 cm thick, quartz agglomerate with front edge built up with same material.
 - 1. Color and pattern: As indicated in the Materials Legend, on the Drawings, or as selected by the Architect from Industry standard colors and patterns.

- C. Backsplashes: 2 cm thick, quartz agglomerate.
- D. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with quartz agglomerate manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 1. Fabricate with loose backsplashes for field assembly.

2.4 COUNTERTOP MATERIALS

- A. Certified Wood Materials: Fabricate countertops with wood and wood-based products produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. Composite Wood Products: Provide products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Particleboard Core: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde. Use at countertops without sinks.
 - 1. Sustainability: Provide particle board containing no added urea formaldehyde, with 100% FSC content, or with not less than 40 percent recycled content.
- D. Plywood Core: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded, containing no added urea formaldehyde, Use at countertops with sinks and at window stools.
- E. Adhesives: Adhesives shall not contain urea formaldehyde.
- F. Adhesives: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- G. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.
 - 1. Manufacturer: Subject to compliance with requirements, provide products indicate in the Materials Legend, on the Drawings.
- H. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with the "Physical Characteristics of Materials" Article of ANSI SS1.
 - 1. Manufacturer: Subject to compliance with requirements, provide products indicate in the Materials Legend, on the Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install countertops and window stools level to a tolerance of 1/8 inch in 8 feet.
- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - 1. Install backsplashes and endsplashes to comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 2. Seal edges of cutouts in subtops by saturating with varnish.

END OF SECTION

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SECTION 14 21 23
ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY AND DEFINITIONS

A. Related Documents

1. Division 01 - Supplementary General Conditions

1.2 Description

- A. Work Included: The extent of the work is indicated on the drawings.
- B. Work of this Section includes labor, materials, tools, equipment, appliances and services required to manufacture, deliver and install the units complete as shown on the drawings, as specified herein, and/or as required by job conditions.
- C. The work and /or requirements specified in all sections is described in singular with the understanding that identical work shall be performed on all units or associated systems unless otherwise specified herein.
- D. The work shall include, but is not limited to the following:
1. Modernization of three (3) 5000 lbs. capacity machine room-less traction service elevators operating at 350 fpm.
 2. Modernization of two (2) 3500 lbs. capacity machine room-less traction passenger elevator operating at 350 fpm, including the addition of one (1) new 3500 lbs. capacity machine room less traction passenger elevator operating at 350 fpm.
- E. Intent
1. The following outlines the scope of work covered in this Section:
 - a. Modernize three (3) existing service elevators.
 - b. Modernize two (2) existing passenger elevators and add one (1) new passenger elevator to form a three (3) car group.
 2. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
 3. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design,

- quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
4. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
 5. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
 6. The Consultant may permit variations from the requirement of these specifications to permit use of the Contractor's standard equipment, provided such standard equipment is in every way adequate for the intended use and meets the full intent of these specifications. All such variations proposed by the manufacturer shall be called to the attention of the Consultant and shall only be made if approved in writing prior to the award of the contract.
 7. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.
 8. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
 - a. Apparatus shall conform to the design and construction standards referenced herein, and shall be rated the best commercial grade suitable for this application.
 - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
 - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years, and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
 9. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.

- a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
 - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
10. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
 11. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
 12. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
 13. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.
 14. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.

F. Related Sections

1. Division 01: Protecting hoistway during installation of equipment, LEED Reporting Form, Construction Waste Management, Sustainable Design Requirements, Indoor Air Quality Management, Volatile Organic Compound Limits.
2. Division 03: Cutting and patching.

3. Division 03: Concrete pits and slabs.
4. Section 03 60 00: Grouting under hoistway door sills.
5. Section 05 12 00: Structural steel hoistway / machine frame.
6. Section 05 50 00: Access Ladders, smoke hole grating, railing and inspection platforms, intermediate support members, sump pit covers.
7. Section 09 60 00: Finished flooring.
8. Division 23: Ventilation of hoistways and control rooms in accordance with code requirements.
9. Division 26: Power feeders to starter panels through fused main line switches for new elevator. New main line disconnects on overhead area
10. Division 26: Branch circuits for new elevator through fused disconnects for car lights.
11. Division 26: Lights and GFI receptacles in overhead, and pit.
12. Division 26: Signal wiring to initiate emergency power operation.
13. Division 26: Modification to smoke detector system. Signal wiring from smoke detectors to a junction box in the machine room.
14. Division 26: Empty conduit runs for wiring required from hoistways to fire command center.
15. Division 26: Shunt trip devices to automatically disconnect the main power supply to the elevators prior to the activation of sprinkler system.
16. Division 27: Life safety system speakers and telephone communication wiring to a junction box in the control room for each elevator.
17. Division 27: Card reader and CCTV Systems, device and their interface with the elevator system.
18. Division 27: Telephone communications wiring terminated in a junction box located next to the controller.
19. Division 27: Ethernet connection in each control room and in location designated for EMIS system.

G. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society

IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

H. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
 - a. Local and/or State laws applicable for logistical area of project work.
 - b. Building Code applicable to the AHJ.
 - c. Elevator Code applicable to the AHJ.
 - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
 - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
 - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
 - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
 - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
 - i. National Electrical Code (ANSI/NFPA 70).
 - j. Americans with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
 - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

I. Reference Standards

1. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
2. ANSI/AWS D1.1 - Structural Welding Code, Steel.
3. ANSI/NFPA 80 - Fire Doors and Windows.
4. ANSI/UL 10B - Fire Tests of Door Assemblies.

5. ANSI/IEEE - 519-Latest Edition
6. ANSI/IEEE - Guide for Surge Withstand Capability (SWC) Tests
7. ANSI Z97.1 - Laminated/Safety Tempered Glass

J. Definitions

1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

1.3 PERMITS AND SUBMITTALS

A. Submittals

1. Comply with the requirements of Division 01.
2. Submit the following

a. Samples

Item No.	Quantity	Size	Description
S1	3	12" x 12"	Exposed finishes as requested by Architect
S2	1	Actual	Each fixture as requested by the Architect
S3	1	Actual	Mitered, corner construction of entrance frame

b. The samples shall be:

- 1) Held on site after inspection and used as a standard for acceptance or rejection of subsequent production units.
- 2) Labeled to identify their intended use and relation to the documents, e.g., car finishes, control panel, etc.
- 3) Returned to the elevator contractor at the completion of the project.

Subject to approval, where an item of equipment is a standard item, copies of the manufacturer's catalogue or brochure may be accepted provided that all dimensions and relevant information are shown in the catalogue or brochure.

- c. Shop Drawings - Submit computer generated project specific layout drawings for approval. Include the following:
 - 1) A listing of all components, devices and sub-systems including:
 - a) Manufacturer and location of plant
 - b) Size and model number
 - 2) Project Specific Control Room Plan indicating:
 - a) Location of equipment and code clearances
 - b) Service connections and disconnect switches
 - 3) Fully dimensioned project specific hoistway plan and section of each unit indicating:
 - a) Platform (with cab), hoistway and entrance dimensions
 - b) All running clearances
 - c) Location of fixtures
 - d) Buffers, service ladders and pit reactions
 - e) Location of inserts
 - f) Rail Reactions
 - 4) Entrance details
 - 5) Project specific fixture details including hall lanterns, hall pushbutton stations, car operating panel, etc.
 - 6) MRL criteria including:
 - a) Location of machine and governor
 - b) Structural requirements and reactions
 - c) Clearances
 - d) Access requirements

3. Calculations

- a. Rail loads
- b. Pit and machine room reactions
- c. Heat emissions in machine room
- d. Electrical loads including, accelerating and running currents. Include all auxiliary loads.
- e. Submit design calculations identifying seismic design forces and support capacities. Calculations shall be certified by a registered professional engineer.

B. Measurements and Drawings

1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.

C. Substitutions

1. Requests for substitutions will be considered under the following time limitations and situations:
 - a. Not less than ten (10) calendar days before bids are due.
 - b. Work or equipment specified becomes unavailable through unforeseen events such as strikes, loss of manufacturer's plant through fire, flood or bankruptcy.
2. Requested substitutions will be reviewed and adjudged. Failure of the Consultant to raise objection shall not constitute a waiver of any of the requirements of the Contract Documents.
3. Request for substitutions shall include complete data with drawings and samples as required, including the following:
 - a. Quality Comparison - Proposed substitution versus the specified product.
 - b. Changes required in other work because of the substitution.
 - c. Effect on the construction schedule.
 - d. Cost Data - Resulting from the proposed substitution versus the specified product. The Contractor shall certify that the cost data presented is complete and includes all related costs under this Contract.
4. When proposing a substitution, the Contractor represents that:
 - a. They have investigated the proposed substitution and have determined that it is equal to or better than the product specified.
 - b. They will guarantee the substitution in the same manner as the product specified.
 - c. They will coordinate and make other changes as required in the work as a result of the substitution.
 - d. They waive all claims for additional costs as a result of the substitution, with the exception of those identified above under "cost data".
5. The Consultant will be sole judge of the acceptability of the proposed substitution.
6. The Consultant will have authority to approve or reject substitutions or to change the specified standards of quality. However, neither this authority to act under this provision nor any decision made in good faith, either to exercise

or not to exercise this authority, shall give rise to any duty or responsibility of the Consultant to the Contractor, any Subcontractor, any Sub-Subcontractor, any of their agents or employees or any other persons performing the work or offering to perform the work.

D. Changes in Scope and Extra Work

1. The Owner may at any time make changes in the specifications, plans and drawings, omit work, and require additional work to be performed by the Contractor.
 - a. Each such addition or deletion to the Contract shall require the Owner and the Contractor to negotiate a mutually acceptable adjustment in the contract price, and, for the Contractor to issue a change order describing the nature of the change and the amount of price adjustment.
 - b. The Contractor shall make no additions, changes, alterations or omissions or perform extra work except on written authorization of the Owner.
 - c. Each change order shall be executed by the Contractor, Owner, and the Consultant.

E. Keys

1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

F. Diagnostic Tools

1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
 - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
 - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
 - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find

it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.

2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.

G. Wiring Diagrams, Operating Manuals and Maintenance Data

1. Comply with the requirements of Division 01.
2. Deliver to the Owner, four (4) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.
3. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats.
4. Manuals, as well as electronic copies, shall contain the following:
 - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
 - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
 - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
 - d. Method of control and operation.
5. Provide four (4) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
 - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
 - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
 - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
6. Furnish four (4) bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants.
7. Manuals or photographs showing controller repair parts with part numbers listed.

H. Training

1. Prior to seeking final acceptance of the project, the Contractor shall conduct an eight-hour training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:

- a. Instructions on proper safety procedures to utilize in assisting passengers that may become entrapped inside an elevator car.
 - b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but, not be limited to:
- a. Independent Service Operation.
 - b. Attendant Service Operation.
 - c. Emergency Fire Recall Operation - Phase I
 - d. Emergency In-car Operation - Phase II.
 - e. Emergency Power Operation.
 - f. Emergency Communications Equipment.
 - g. Hospital Emergency Service.
 - h. Emergency Priority Service Operation.
 - i. Interactive Systems Management.
 - j. Remote Monitoring/Controls.
 - k. Emergency Hoistway Access and Rescue Features.

I. Patents

1. Patent licenses which may be required to perform work specified by the Contract Documents shall be obtained by the Contractor at its own expense.
2. The Contractor agrees to defend and save harmless the Owner, Consultant and agents, servants, and employees thereof from any liability resulting from the manufacture or use of any patented invention, process or article of appliance in performing work specified in the Contract Documents.

J. Advertising

1. Advertising privileges shall be retained by the Owner.
2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

1.4 QUALITY ASSURANCE

A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
 - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.

- b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

C. Accessibility Requirements

1. Locate door reopening devices at 5" and 29" above the finish floor when individual contact projection apparatus is employed.
2. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
3. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
4. The centerline of existing hall push button shall be 42" to 48" above the finished floor.
5. The centerline of new hall push button shall be 42" above the finished floor.
6. The hall arrival lanterns or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
7. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
8. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.

9. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ.
10. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
11. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
12. Provide visual call acknowledgment signal for car emergency intercommunication device.

D. Qualifications

1. The work shall be performed by a company specialized in the business of manufacturing, installing and servicing conveying systems of the type and character required by these specifications with a minimum of ten (10) years experience.
2. Prior written acceptance is required for manufacturers other than those listed, before quoting this project. Requests for acceptance will not be considered unless they are submitted before bid date and are accompanied by the following information:
 - a. List of five (5) similar installations having exact equipment being proposed for this project arranged to show name of project, system description and date of completed installation. The list shall include the names, position and resumes of the construction team and field supervisor of the installations.
 - b. Complete literature, performance and technical data describing the proposed equipment. Include the names, position and resumes of the proposed construction team and field supervisor.
 - c. List of ten (10) service accounts by building name, building manager or owner, including phone numbers.
 - d. Location of closest service office from which conveying system will be maintained.
 - e. Location of closest parts inventory for this installation.
 - f. List of the names, positions and resumes of the construction teams and field supervisor for the installation.

1.5 DELIVERY / STORAGE / HANDLING / COORDINATION

A. Delivery and Storage of Material and Tools

1. Comply with the requirements of Division 01.
2. Delivery, Storage and Handling:
 - a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
 - b. Store materials under cover in a dry and clean location, off the ground.
 - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.

B. Work with Other Trades / Coordination

1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
2. Coordinate sequence of installation with other work to avoid delaying the Work.
3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

C. Removal of Rubbish and Existing Equipment

1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.

D. Protection of Work and Property

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

1.6 WARRANTY / MAINTENANCE SERVICES

A. Contract Close-Out, Guarantee and Warranties

1. Comply with the requirements of Division 01.
2. Guarantee and Warranties:
 - a. Warrant the equipment installed under these specifications against defects in material and quality of installation and correct any defects not due to ordinary wear and tear or improper use of car which may develop within one year from the date each unit is completed and placed in permanent operation and accepted by the Owner.
 - b. This warrantee shall be written and issued at the completion of each unit prior to final payment.

B. Maintenance

1. Interim Maintenance: Provide full protective maintenance on the units that are completed and accepted by the AHJ and that may be put in service prior to the overall project completion. The maintenance service shall be as hereinafter specified under the Full Protective Maintenance Service in "3" below and include all code mandated safety and local law tests and inspections that may come due while on this service.
 - a. The price quoted shall be on a per unit per month basis.
2. Warranty Maintenance: Provide full protective maintenance on the specified equipment for a period of twelve (12) months from the date of final acceptance of the entire installation as specified under the Full Protective Maintenance Service in "3" below.
 - a. The price for this service shall be included in the base price or as otherwise specified in the contract documents.
3. Full Protective Maintenance Service: Submit a separate price for a Full Protective Maintenance Service for the specified units based on a five (5) year contract. The price shall be submitted on the company's own form but shall

include all requirements as specified hereinafter. Note: All maintenance shall comply with Part 8 of the ASME A17.1 Code and modified or amended by the Authority Having Jurisdiction.

- a. Maintenance work shall be performed by trained personnel directly employed and supervised by the service contractor.
- b. Perform scheduled maintenance work and repairs during the regular working hours of regular working days of the trade. All work shall be coordinated with the Building Manager.

C. Alternates

1. Value Engineering Alternate

- a. It is understood that the base specification reflects minimum standards. The above Value Engineering Alternate allows individual contractors to suggest special performance criteria which may be of interest to the Owner and may reflect a degree of quality above the requirements of the base specification.
- b. Voluntary alternate prices may be acceptable as a deviation from, not a substitution for, the basis of bid work of this bid package.
- c. In order to submit a voluntary alternate, the following must be provided at the time of the bid.
 - 1) A complete bid reflecting the requirements of the base specification.
 - 2) All alternates must be accompanied with pertinent data, technical documentation and reference/installation for review.
 - 3) Along with the pricing for voluntary alternates submit the maintenance prices for each.

PART 2 - PRODUCTS

2.1 ELEVATORS

A. Service Elevators 30, 31, 32

1.	Quantity	Three (3)
2.	Type	Machine-room-less service
3.	Capacity (lbs)	5000
4.	Speed (fpm)	350
5.	Travel in Feet	Refer to Architectural Drawings
6.	Roping/Ropes	2:1
7.	Number of Landings	Cars 30, 31: Six (6) existing, five (5) new Car 32: Seven (7) existing, four (4) new
8.	Number of Openings	Same as landings
9.	Front Openings	Cars 30, 31: Six (6) existing at floors SB, B, 1-4, five (5) new at floors 5-7, ROOF, HELIPAD Car 32: Seven (7) existing at floors SB, B, 1-5, four (4) new at floors 6, 7, ROOF, HELIPAD
10.	Rear Openings	None
11.	Operation	Group automatic
12.	Control	Variable voltage variable frequency
13.	Fireman's Control	Phase I and II
14.	Emergency Hospital Service	Required
15.	Priority Evacuation Service	Required
16.	Number of Push Button Risers	Retain existing, provide new stations at new floors served
17.	Platform Size	Retain existing
18.	Guide Rails	Steel tees, retain existing. Provide new sections for additional travel
19.	Buffers	Oil, retain existing
20.	Car Door Size	4'-6" wide x 7'-0" high, provide new
21.	Hoistway Door Size	Same as car door. Retain at existing floors, provide new for new floors served
22.	Door Operation	Two speed side opening
23.	Machine Type	New Gearless PM
24.	Counterweight Safety	Not Required
25.	Compensation	Encapsulated Chain
26.	Power Supply	Field Verify
27.	CCTV and Card Reader	By Others

28.	CCTV and Reader Cable	Required
29.	PA Speaker	By Others
30.	PA Cable	Required
31.	Entrances	Retain at existing floors, provide new brushed stainless steel at new floors served
32.	Landing Fixture	Brushed stainless steel
33.	Landing Sills	Retain at existing floors, provide extruded aluminum at new floors
34.	Car and Landing Call Buttons	Round stainless steel with concealed fasteners and LED call acknowledging lights.
35.	Car Operating Fixtures	New car operating panel in swing front returns, cast metal designation markings, flush stud mounted. LED car position indicators.
36.	Communication	Intercom with a station in each car, a master station in each machine room and a master station in each remote monitoring panel.
37.	Door Protective Device	Retain existing.
38.	Emergency Light Fixture	Two cab light fixtures will be arranged to operate as an emergency light fixture for at least 2 hours.
39.	Car Fan	Retain existing
40.	Cab Enclosure	Retain existing and modify for installation of new return panels
41.	EMIS System	Required
42.	Fire Command Panel	Required

B. Passenger Elevators 33, 34

1.	Quantity	Two (2)
2.	Type	Machine-room-less Passenger
3.	Capacity (lbs)	3500
4.	Speed (fpm)	350
5.	Travel in Feet	Refer to Architectural Drawings
6.	Roping/Ropes	2:1
7.	Number of Landings	Five (5) existing, two (2) additional new
8.	Number of Openings	Same as landings
9.	Front Openings	Five (5) existing at floors B, 1-4, two new landings at floors 6, 7
10.	Rear Openings	None
11.	Operation	Group automatic w/new passenger elevator
12.	Control	Variable voltage variable frequency
13.	Fireman's Control	Phase I and II
14.	Emergency Hospital Service	Required
15.	Priority Evacuation Service	Required

16.	Number of Push Button Risers	Retain existing, provide new stations at new floors served
17.	Platform Size	Retain existing
18.	Guide Rails	Steel tees, retain existing. Provide new sections/brackets for additional travel.
19.	Buffers	Oil, retain existing
20.	Car Door Size	3'-6" wide x 7'-0" high, provide new
21.	Hoistway Door Size	Same as car door, provide new at new floors served
22.	Door Operation	Single speed center opening
23.	Machine Type	Gearless PM
24.	Counterweight Safety	Not Required
25.	Compensation	Not required
26.	Power Supply	Field verify
27.	CCTV and Card Reader	By Others
28.	CCTV and Reader Cable	Required
29.	PA Speaker	By Others
30.	PA Cable	Required
31.	Entrances	Retain at existing floors, provide new brushed stainless steel at new floors served
32.	Landing Fixture	Brushed stainless steel
	a. Landing Sills	Retain at existing floors, provide extruded aluminum at new floors
	b. Car and Landing Call Buttons	Round stainless steel with concealed fasteners and LED call acknowledging lights.
33.	Car Operating Fixtures	New car operating panel in swing front returns, cast metal designation markings, flush stud mounted. LED car position indicators.
34.	Communication	Intercom with a station in each car, a master station in each machine room and a master station in each remote monitoring panel.
35.	Door Protective Device	Retain existing.
36.	Emergency Light Fixture	Two cab light fixtures will be arranged to operate as an emergency light fixture for at least 2 hours.
37.	Car Fan	Retain existing
38.	Cab Enclosure	Retain existing and modify for installation of new return panels
39.	Entrances	Retain at existing floors, provide new brushed stainless steel at new floors served
40.	Landing Fixtures	Brushed stainless steel
41.	EMIS System	Required
42.	Fire Command Panel	Required

C. New Passenger Elevator 35

43.	Quantity	One (1)
44.	Type	Machine-room-less Passenger
45.	Capacity (lbs)	3500
46.	Speed (fpm)	350
47.	Travel in Feet	Refer to Architectural Drawings
48.	Roping/Ropes	2:1
49.	Number of Landings	Seven (7)
50.	Number of Openings	Same as landings
51.	Front Openings	At floors B, 1-4, 6, 7
52.	Rear Openings	None
53.	Operation	Group automatic w/existing passenger elevators 33, 34
54.	Control	Variable voltage variable frequency
55.	Fireman's Control	Phase I and II
56.	Emergency Hospital Service	Required
57.	Priority Evacuation Service	Required
58.	Number of Push Button Risers	Retain existing, provide new stations at new floors served
59.	Platform Size	7'-0" wide x 6'-2" deep approximately
60.	Guide Rails	Steel tees.
61.	Buffers	Oil.
62.	Car Door Size	3'-6" wide x 7'-0" high
63.	Hoistway Door Size	Same as car door
64.	Door Operation	Single speed center opening
65.	Machine Type	Gearless PM
66.	Counterweight Safety	Not Required
67.	Compensation	Not required
68.	Power Supply	Field verify
69.	CCTV and Card Reader	By Others
70.	CCTV and Reader Cable	Required
71.	PA Speaker	By Others
72.	PA Cable	Required
73.	Entrances	Brushed stainless steel at all floors served
74.	Landing Fixture	Brushed stainless steel
	c. Landing Sills	Provide extruded aluminum at new floors
	d. Car and Landing Call Buttons	Round stainless steel with concealed fasteners and LED call acknowledging lights.
75.	Car Operating Fixtures	Car operating panel in swing front returns, cast metal designation markings, flush stud mounted. LED car position indicators.

76.	Communication	Intercom with a station in each car, a master station in each machine room and a master station in each remote monitoring panel.
77.	Door Protective Device	Full height infra red door screens
78.	Emergency Light Fixture	Two cab light fixtures will be arranged to operate as an emergency light fixture for at least 2 hours.
79.	Car Fan	2 speed fan
80.	Cab Enclosure	Provide new to match existing elevators 33, 34
81.	Entrances	Provide new brushed stainless steel at new floors served
82.	Landing Fixtures	Brushed stainless steel
83.	EMIS System	Required
84.	Fire Command Panel	Required

2.2 MANUFACTURERS

A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved for use on this project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
3. Certain Original Equipment Manufacturers equipment is acceptable unless otherwise specified.
 - a. Machine Room Less Elevators – Otis GEN2 Oversluing
 - b. Controller - Otis
 - c. Tracks, Hangers, Otis
 - d. Door Protective Device - Janus, Adams, G.A.L., T.L. Jones, Tri-Tronics.
 - e. Cabs and Entrances/Entrance Door Panels – Otis, EDI/ECI, National Cab & Door, Tyler, Gunderlin, Columbia Elevator Products.
 - f. Machines - Otis.
 - g. Motors - Otis.
 - h. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
 - i. Guide Rails - AFD Industries, Savera, Monteferro.
 - j. Electrical Traveling Cables - Draka, James Monroe
 - k. Guide Shoes/Rollers – Otis.
 - l. Suspension Means - Otis.
 - m. Intercommunications/Telephones - Webb Electronics, K-Tec, Ring, Wurtec, Janus, approved equal.
4. Original Equipment Manufacturers may substitute their own branded equipment subject to the following:
 - a. All requirements of the specifications are met regarding performance, appearance, serviceability and support.

- b. A full stock of all regular and critical replacement parts required for this project are maintained at a facility within fifty (50) miles of the project site.
 - 1) Any parts not stocked at the above referenced facility shall be identified with the location of the nearest source and shall be available for next-day delivery upon demand.
- c. All parts and software shall be made available for purchase to a qualified elevator maintenance firm with one-business day delivery without direct Owner involvement.
 - 1) Provide details of parts supply facility and a list of current parts pricing for all major components required for the installation.
- d. All specialized tools, equipment, software, and passwords, required to maintain, repair, adjust the operation, and perform code mandated inspections are provided to the Owner as part of the base installation.
 - 1) Updates to these items shall be available via the parts supply facility referenced above.
- e. Technical support of the product(s) shall be available to the Owner's elevator service provider.

2.3 CONTROL FEATURES / OPERATION

A. Cross Cancellation (Passenger Elevators)

- 1. A temporary dispatch signal control interface shall be provided during the interim modernization period between the existing dispatching control panel and the new microprocessor supervisory control system.
- 2. The overlay interface shall allow either system to cross cancel corridor calls registered in both systems and maintain an acceptable level of group dispatching operations.
- 3. The existing equipment that is retained on a temporary basis shall undergo a complete maintenance restoration to ensure improved reliability and performance during the primary work implementation period.

B. Motion Control

- 1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
- 2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
 - a. The amplitude of acceleration and deceleration shall not exceed 2.6 - 2.8 ft./sec² for geared and MRL traction, and 3.5 - 4 ft./sec² for gearless traction elevators.

- b. The maximum jerk rate shall be 1.5 to 2.0 times the acceleration and deceleration.
 - c. The maximum velocity which the elevator achieves in either direction of travel while operating under load conditions that vary between empty car and full rated load shall be within $\pm 3\%$ of the rated speed.
 3. Floor leveling accuracy of $\pm 1/4"$ as measured between the car entrance threshold and the landing sill on any given floor shall be provided.
 - a. This accuracy standard shall be maintained under varying load conditions and without need for releveling corrections caused by overshooting or stopping short of the floor.
 4. Elapsed flight time during a typical elevator one floor run shall not exceed values as further specified.
 - a. Timing, as measured between the moment door closing operations begin and when the doors are $3/4$ open at the next adjacent floor, shall remain consistent under varying load conditions in either direction of travel.
- C. Automatic Group Operation / Conventional Dispatch
 1. Provide a microprocessor based group supervisory control system for the operation of the elevators.
 2. Elevators shall be arranged to operate with or without attendants as an automatic group.
 - a. The group shall remain capable of sustaining balanced service and continuing operation with one or more cars removed from the system.
 - b. Elevators shall operate from pushbutton panels located inside each car and from a riser or corridor pushbutton fixtures located on each landing served.
 3. Elevators shall automatically travel to landings for which a call demand exists.
 - a. Stops in response to calls that are registered at either the car or hall push button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered.
 4. Call acknowledgment lights provided in both the car and hall push button fixtures shall become extinguished as the car responding to a particular call begins its slowdown approach to the corresponding landing.
 5. In the event no demand for elevator service exists, the first car to satisfy its assigned calls shall be dispatched to park at the main landing.
 - a. In the event additional cars should also complete their call assignments, those cars shall be individually dispatched to previously designated parking floors.
 - b. Parking assignments shall be accomplished without door operation.

- c. Should the elevator parked at the main landing receive a call assignment, another free car in the group shall immediately assume that parking assignment.
 - d. The number of elevators assigned to park at any particular landing shall be programmable.
6. The group supervisory controller shall, through a dispatching algorithm along with artificial intelligence parameters, continuously scan the system in order to determine the load each car is transporting and to monitor the number of corridor calls registered, the duration of each call, and the intended direction of travel, the number of loaded lifts, etc.
 - a. Based upon that data, the supervisory system shall automatically devise a strategy for call assignment with preference given to calls registered in the following order:
 - 1) lobby demand
 - 2) long waiting times - down
 - 3) long waiting times - up
 - 4) up calls
 - b. Long wait calls shall be considered those which have remained unanswered for at least forty (40) seconds. The long wait call threshold time shall be programmable.
7. If a car with no car calls arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
 - a. If no car call is registered, the car shall be assigned to respond to the call registered for opposite direction.
 - b. The doors shall close and immediately re-open when responding to this call.
 - c. Hall lantern operation shall always correspond to direction of service.
8. In the event that any car is delayed for more than a predetermined time interval after it received a start signal, the system shall automatically permit the remaining cars in the group to respond to signals and be dispatched in the specified manner.
9. In the event the group dispatching or supervisory system should malfunction so that elevators are not assigned to calls within a predetermined interval and in accordance with the conditions of the operating strategy in effect, the system shall automatically assume a back-up mode of operation whereby the elevators shall be arranged to provide continuous service to each landing in a predetermined pattern without regard to actual corridor demand.
 - a. Failure of the automatic dispatching system will be indicated by an illuminated signal in the Lobby Elevator Control Panel or Elevator Information and Management System where applicable.

10. In the event of failure of the landing call button circuit, provide a means to enable the elevators to service each floor without registration of a call within the elevators.
 - a. When emergency operation is in effect, provide an illuminated signal in the Lobby Elevator Control Panel or Elevator Information and Management System where applicable.
11. When a car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
12. When a car has responded to the highest or lowest call, and hall calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
13. When an empty car reverses direction at a landing with no hall calls, doors shall not open and the hall lantern shall not operate.
14. Main Lobby Operation:
 - a. Only the "Next" designated car shall have its hall lantern illuminated and its doors open.
 - b. When a "down" traveling car which is not designated "Next" arrives at the main lobby with a lobby car call registered, it will open its door to discharge the passengers, close the doors, and shall not illuminate its lantern.
 - c. When a "down" traveling car with no car calls arrives at the main lobby and is not designated "Next", it shall park without opening its doors.
15. Coincident Calls:
 - a. The dispatching system shall be designed with a 20 second parameter whereby an elevator with a car call will receive priority to answer a corresponding corridor call if it can do so within 20 seconds.
 - b. If the elevator cannot answer the call within the prescribed time, the first available car shall be assigned.
 - c. A continuous reassessment of calls shall be made.

D. Independent Service Operation

1. The car operating station shall be equipped with a key-operated switch labeled "IND SER".
2. Locate the switch in the locked access compartment.
3. When placed in the "on" position the following shall occur:
 - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.
4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.

5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

E. Inspection Service Operation

1. Provide a key operated switch in the main car operating panel that, when turned to the 'ON' position, shall cause the elevator to be removed from service and placed in Inspection Service Operation.
2. Limited operation of the car shall be provided through pressing the Attendant Service up and down push buttons (if provided) or the highest or lowest car call push buttons (if up and down buttons are not provided) in the main car operating panel only.
3. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
4. The Inspection Service switch shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
 - a. Visual and audible indication shall be provided on the top of the car when Firefighters' Emergency Operation is initiated.
6. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
7. The in-car Inspection Service switch shall be rendered ineffective when the top of car inspection control is activated.
8. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

F. Hoistway Access Operation

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.
2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.

4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

G. Load Weighing Operation

1. A positive means shall be provided to continuously monitor the amount of load being transported by the elevator car.
2. The system shall be used to;
 - a. Preload static motor drives
 - b. Activate control features that include:
 - 1) anti-nuisance operation
 - 2) load dispatch operation
 - 3) load dependent non-stop operation where applicable.
3. The anti-nuisance feature shall operate at loads not exceeding 200 lbs., whereas load dispatch and load non-stop shall be set to function at 65% of the rated loading capacity for the initial set up and adjustment procedure.

H. Anti-Nuisance Operation

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
 - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.
 - b. If after the third stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.
 - c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to 3 calls.

I. Firefighters' Emergency Operation

1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.
 - a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
 - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.

3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
 - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the "OFF" position.
 4. A standardized Fire Recall Key shall be used where required by the codes and standards applicable to the AHJ.
 5. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.
 6. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
 - a. The cover of the locked access panel shall be engraved as required by local or State law.
 - b. The locked access panel shall contain:
 - 1) Phase II key switch.
 - 2) Fire indicator light.
 - 3) Call cancel push button.
 - 4) Door open push button.
 - 5) Door close push button.
 - 6) Run/Stop switch.
 - 7) Other devices as may be required by local law.
 - c. Engrave the Firefighters' Service operating Instructions on the inside of the locked cabinet door.
- J. Emergency Power Operation / All Elevators Operational
1. Upon loss of normal power, and establishing of emergency power, all elevators shall automatically resume normal operation.
 - a. Elevators shall start sequentially so as to prevent overloading of the emergency power system.
 - b. Sequential transformer connection operation shall be employed where necessary to reduce half-cycle inrush currents.
 2. An illuminated signal marked "ELEVATOR EMERGENCY POWER" shall be provided in the elevator lobby at the designated level to indicate that the normal power supply has failed and the emergency power is in effect.
 3. Prior to return to normal power, the building ATS shall provide a "pre-transfer" signal to the elevator equipment that will initiate the landing of elevators prior to transfer from emergency power to normal power.
 - a. Timer of the pre-transfer signal shall be adjustable from 15 to 30 seconds.
 4. The following additional requirements apply:

- a. Firefighters' Service Operation, if in effect, will remain active at all times during emergency power operation.
 - b. Car lighting will remain active with car lighting on separate emergency power feeders in addition to battery back-up.
 - c. Communications will remain active at all times on emergency power feeders in addition to battery back-up.
 - d. Remote monitoring, where provided, will be active from each group dispatcher for selected elevators using an uninterruptible power supply (UPS) to maintain the central processing unit during power transfers.
 - e. Position indicator for each elevator will be active in the selected elevator and security room (where applicable), as well as lobby display panels.
5. Testing of elevators under emergency power shall be accomplished with the building ATS providing necessary "pre-transfer" signals to the elevator control apparatus.
- a. Prior to testing, the building ATS shall provide a "pre-transfer" signal to initiate the landing of the elevators prior to the transfer from normal to emergency power.
 - b. After testing, the building ATS shall provide a "pre-transfer" signal to initiate the landing of the elevators prior to the transfer from emergency to normal power.
- K. Elevator Safety Requirements for Seismic Zone 2
1. Guarding of equipment, machine supports, guide rail systems, the design of counterweight car frame and platform, safeties and signaling devices shall meet the requirements of ASME A17.1 as may be modified by the AHJ.
 2. Guide rails, guide rail supports and their fastenings shall meet requirements for the seismic zone.
- L. Floor Lockout Feature - Card Reader Control / Wiring Provisions
1. Wiring: Provide six (6) pair of 20 gauge two (2) flexible conductor low voltage cables with an overall braided shield in the traveling cable of all elevators for card reader interface.
 - a. The cables shall extend from the security interface terminal cabinet in the elevator machine room to behind the elevator return panel above the space allotted for the card reader.
 - b. Terminate the cable to dual screw barrier terminal strips on each end.
 2. Card Reader Space: Allocate card reader space in each main car station as directed by the Architect.
 3. Interface: For floor programmable card access control in all elevators, provide a pair of terminals for all floors such that application of a momentary dry (no voltage present) contact closure across those terminals by the security system shall enable the selection of the corresponding floor from the floor selector button in the elevator cab.

- a. Locate the terminals inside an interface terminal cabinet in the elevator machine room.
 - b. Provide all relays required to interface the elevator control system to the momentary dry contact closures provided for under another section of these specifications.
 - c. If applicable, the card reader shall be operable and compatible with the issued card keys used building wide.
 - d. Coordinate system requirements with the manufacturer of the issued card key system.
4. Card Reader "Secure/Bypass" Switch: Provide separate card reader control bypass key switches for each elevator.
- a. The bypass key switches shall be located in the Director's Control Panel.
 - b. The bypass key switches shall be a maintained contact type key switch with the key removable in the secure or bypass position.
 - 1) When the key switch is in the secure position, the card reader control mode shall be initiated.
 - 2) When in the bypass position, the card reader control mode shall be bypassed and the elevator shall return to normal operation, permitting free access to any floor.
5. The card reader operation shall bypass floor cut-out switches.
6. Firefighters' Service Operation shall override Floor Lockout Feature.

M. Hospital Emergency Service Operation

1. Activation of any individual corridor hospital emergency service operation key switch shall remove the car from automatic group operation for immediate response to the emergency demand floor.
2. An emergency demand shall cancel or override all registered car calls for this elevator unless the system is functioning under fire emergency control operations, attendant service or independent service.
3. When "Hospital Emergency Service" is activated while this elevator is operating under a special mode as specified above, the "in-car" audible and visible signals shall alert the operator to place the car back in automatic mode for immediate response.
4. Upon arrival at an emergency activated floor, the elevator shall remain parked for an adjustable timed period of one (1) to five (5) minutes or until the "in-car" emergency switch is activated for emergency service independent operation.
5. The elevator shall remain on emergency independent service until the "in-car" switch is returned to the normal operating mode.

N. Executive Priority Service Operation / More than One Elevator Responding

1. Executive Priority Service shall be initiated by a landing key switch at the main egress floor.

2. The car able to respond in the shortest time shall answer the registered call after answering prior car calls.
 3. When the car reaches the landing at which the call was registered, one of the following shall occur:
 - a. If no car call is entered within a preset (adjustable) time, the car shall close its doors and resume normal operation.
 - b. If a car call is entered and the Door Close Button is pressed, the car shall serve the car call then resume normal operation.
 - 1) This operation shall be adjustable so that more than one (1) car call may be entered and the car remains in Executive Priority Service until no further car calls are present.
 4. This feature shall include a priority service light in the hall and will activate the "Please Exit When Doors Open" message indicator in the car when the car responds to the priority key switch signal.
 5. Override the Priority Service feature with fire emergency control in accordance with code and local law.
- O. Passenger Rescue Feature
1. Provide a device in the control room to move the elevator car to a floor landing in the event of controller or power failure.
 - a. This device must be speed controlled to prevent an overspeed condition.
 - b. A line of sight must be provided between the Passenger Rescue Feature device and the elevator car.
 - 1) Coordinate line of sight requirements with the control room requirements.
 2. Provide a manual brake release lever attached to the control cabinet for rescue of passengers.
 - a. A visual display shall be provided with the control cabinet, which indicates car position, speed and directions.

P. Door Operation

1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.
 - a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of 1.0 feet per second in accordance with governing code.
 - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.
2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed 30 lbf. This force shall be measured on the leading edge of the door with the door at any point between one third and two thirds of its travel.
4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
 - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open dwell time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.
6. The operation of the door protective device by physical contact (mechanical safety-edge) or the interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired, and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a "door open" and "door close" push button.
 - a. Pressure on the "door open" button shall cause doors in the full open position to remain so and doors engaged in the close cycle to reverse direction and assume the full open position so long as pressure remains applied to the button.

- b. The "door open" buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
 - c. The "door close" push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.
9. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
 - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.
10. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
11. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.

2.4 CONTROL ROOM / OVERHEAD EQUIPMENT

A. Controller / Dispatcher

1. The elevators shall have microprocessor based controller/dispatchers.
2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
5. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, electronic circuit boards, microprocessors, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
 - a. Provide natural or mechanical ventilation for the controller cabinets.
 - b. Equip the vent openings and exhaust fans with filters.
6. Mount equipment to moisture-resistant, noncombustible panels supported from the steel frame.
7. Provide "noise filter" between hoistway wiring and controller/dispatchers to eliminate interference.
8. Optically isolate communication cables between components.
9. Wiring: Wiring on the units, whether factory or field wiring, shall be done in neat order, and all connections shall be made to studs and/or terminals by means of grommets, solderless lugs or similar connections. All wiring shall be copper.

10. Terminal Blocks: Provide terminal blocks with identifying studs on units for connection of board wiring and external wiring.
11. Marking: Identifying symbols or letters shall be permanently marked on or adjacent to each device on the unit, and the marking shall be identical with marking used on the wiring diagrams. In addition to the identifying marks, the ampere rating shall be marked adjacent to all fuse holders.
12. A 17" flat-panel LCD monitor shall be provided inside the elevator machine room for diagnostic purposes. The monitor shall be permanently mounted in a cabinet, on a shelf immediately adjacent or attached to or in a control cabinet of at least one car of a group. By means of graphic depiction, information available on the screen shall include:
 - a. An overview of car and corridor calls currently existing within the system.
 - b. Elevator operating status.
 - c. Elevator position, direction of travel and velocity.
 - d. The open/close status of elevator door.
 - e. The current operational status of each CPU input and output.
 - f. A sequential history of faults detected within the control system over the previous thirty (30) days.
13. In the event diagnostics and monitoring is accomplished via Field Service Tools, provide the required Field Service Tools with related control system appurtenances for diagnostic evaluations, system monitoring and field adjustments.
 - a. Provide instructions for proper use of such diagnostic tools and/or equipment with all coding and other operational requirements.
 - b. Maintain and calibrate the diagnostic tools, and update the associated instructions and other related documents under the service agreement.
 - 1) Should the agreement be cancelled for any reason by either party, maintenance and updating of diagnostic tools shall be provided to the Owner at the Contractor's cost without the need to purchase or lease additional diagnostic devices, special tools or instructions from the original equipment provider.
 - 2) The Owner may request field and technical instructions be provided by the original installation contractor or manufacturer for proper servicing by other qualified elevator company personnel.
 - 3) The established cost plus profit, as previously specified, shall be applicable for the life of the system.
 - a) If the equipment for fault diagnosis is not completely self-contained within the controllers but requires a separate detachable device, that device shall be furnished to the Owner as part of this installation.
 - b) Such device shall be in possession of and become property of the Owner.
14. Microprocessor Documentation

- a. Provide and/or obtain complete information on systems' design, component parts, installation and/or modification procedures, adjusting procedures and associated computer conceptual logic circuitry and field connection.
- b. Provide microprocessor upgrading and/or modifications to programs that have been assigned to enhance the operation of the equipment for a period of 10 years after project approval.

B. Gearless Elevator Hoisting Machine

1. Provide a permanent magnet synchronous motor (PMSM) gearless traction machine for all elevators, specially designed and manufactured for elevator service. The machine shall have high starting torque and low starting current, rated for 50⁰ C (90⁰ F) continuous operation, and a minimum of 240 starts per hour.
 - a. The traction driving sheave and brake drum shall be cast integral and bolted securely to the main armature shaft.
 - b. Securely mount the machine frame, including motor fields, bearing stands and brake on a heavy steel bedplate.
 - c. The armature shaft shall be supported in ball or roller type bearings.
 - d. The driving sheave shall be cast from the best grade of metal with a Brinell hardness of 215 to 230 and shall be machined with grooves, providing maximum traction with a minimum of rope and sheave wear.
 - 1) Roping requirements and type of steel rope used as suspension means shall be engineered by the contractor and manufacturer of the equipment for maximum life of ropes and sheave.
 - e. Ensure that adequate ventilation of internal stator windings and rotating element is provided to prevent overheating with thermal overload protection. (Constant velocity fan for constant cooling.)
 - f. Equip housing with eyebolt(s) for lifting.
 - g. Provide a spring applied and electrically released electro-mechanical brake.
 - h. Swivel type brake shoes shall be applied to the braking surface simultaneously and with equal pressure by means of helical compression springs.
 - i. Design the brake for quick release to provide smooth and gradual application of the brake shoes.
 - 1) An emergency brake shall be an integral part of the machine design.
 - j. Provide 14-gauge hoist cable guards at the car-drop and counterweight-drop side of the machine sheave.
 - 1) Guards shall cover cables from the point of slab penetration to the point where the hoist cables contact the sheave.
 - 2) Guards shall prevent access to cables at pinch points.
 - 3) Guards shall have no sharp edges.

4) Guards shall be properly mounted to prevent vibration.

C. VVVF AC Drive

1. Provide a solid-state, variable voltage, variable frequency (VVVF), 3-phase AC hoist motor drive system as part of the microprocessor-based equipment.
 - a. VVVF drive system shall be a low-noise, flux-vector inverter device.
 - b. Include a digital LED readout and touch-key pad to facilitate software parameter adjustments, monitor system operation and display fault codes.
2. The drive shall utilize a 3-phase, full wave rectifier and capacitor bank to provide direct current power for solid-state inversion.
3. The inverter shall utilize IGBT power semiconductors and duty cycle modulation fundamental frequency of not less than one kilohertz to synthesize 3-phase, variable voltage variable frequency output.
4. The system shall be designed and configured with the following countermeasures for noise generated by the pulse-width modulated (PWM) inverters.
 - a. Control of radiated noise via inverter and/or motor cables.
 - b. Conducted noise through power lines.
 - c. Induction noise and ground noise.
5. Inverter shall be encased in metal and independently grounded.
6. A noise filter for the input power line shall be provided to prevent penetration into radios, wireless equipment and smoke detectors.
7. A 3% three-phase line reactor shall be provided on the power system rated at the utility voltage input to the drive and sized for the rated drive current.
8. The drive shall:
 - a. Be configured as a complete digital drive system.
 - b. Be totally software configurable.
 - c. Interface with external equipment/signals via either discrete local I/O connections or high speed Local Area Network (LAN).
 - d. Be located within the limits of the control cabinet (where system size allows) or separately mounted in an appropriate chassis with hinged swing-out doors with clearances equal to the cabinet width dimensions.
 - e. Provide programmable linear or S-curve acceleration.
 - f. Provide free run or programmable linear or S-curve deceleration.
 - g. Have controlled reversing.

9. Operating and Environmental Conditions:

- a. Have a service factor of 1.0.
- b. Rated for continuous duty.
- c. Humidity - 90% rated humidity non condensing.
- d. Cooling - forced air when required.
- e. Digital display for:
 - 1) Running - output frequency, motor RPM, output current, voltage.
 - 2) Setting - Parameters values for setup and review.
 - 3) Trip - separate message for each trip, last 30 trips to be retained in memory.

10. Protective Features:

- a. Motor overspeed.
- b. Adjustable current limit.
- c. Isolated control circuitry.
- d. Digital display for fault conditions.
- e. Selectable automatic restart at momentary power loss.
- f. Manual restart.
- g. Over/Under Voltage.
- h. Line to line and line to ground faults.
- i. Over-temperature.

D. VVVF AC Drive - Regenerative Module

1. The system shall provide full regenerative capabilities to control overhauling motor speed and reduce hoist motor deceleration time by allowing overhaul power to be discharged back into the power lines.
 - a. The regenerative section may be an integral part of the drive or a stand-alone unit mounted in a separate cabinet with proper ventilation as required by the manufacturer.

E. Overspeed Governor

1. Provide a speed governor, located overhead, to operate the car safety.
 - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
 - 1) Springs used to develop the tension are not acceptable.
 - b. Provide rope grip jaws, designed to clamp the governor rope to actuate the car safety upon a predetermined overspeed downward.

- 1) The centrifugal type governor shall trip and set rope jaws within 60 degrees of governor sheave rotation after reaching rated tripping speed.
- c. Design the governor rope tripping device so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the car safety.
- d. Provide an electrical governor overspeed protective device which shall remove power from the driving machine motor and brake before or at the application of the safety.
 - 1) The setting for the overspeed switch shall be as prescribed in the ASME A17.1 Safety Code.
 - 2) Locate and enclose the switch to insure that excess lubrication will not enter the switch enclosure.
 - 3)** Overspeed switch shall operate in both direction of travel on systems employing a static power drive unit.
- e. Seal and tag the governor with the running speed, tripping speed and date last tested.
- f. Design the governor to prevent false tripping due to conditions caused by rope dynamics.
- g. Governor shall be mounted to the guide rail system or machine beam supports in the hoistway overhead.
 - 1) Coordinate access requirements and testing procedures with the AHJ.
 - 2) Where governor access is not required by the AHJ, governor shall be capable of being manually reset from outside the hoistway.

F. Equipment Isolation

1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state motor drives, isolation transformers, reactance units, hoisting motors and machines.
2. The elements for controllers, solid-state motor drives and isolation transformers shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
3. Elements between the hoisting machine unitized base and machine support beams shall be similar to triple layer ribbed neoprene pads, separated by appropriate steel shims as manufactured by Mason Industries, Type W pads, at 50 durometer, loaded for 40 psi or approved equal.
4. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
5. Isolation of existing hoisting machine and motor is contingent on the OEM design of the apparatus.
 - a. Existing isolation pads shall be replaced with new.

G. Ascending Car Overspeed Protection Device

1. Provide a device designed to prevent an ascending elevator from striking the hoistway overhead structure.
2. The device shall decelerate the car with any load up to the rated capacity by applying an emergency brake.
 - a. The device shall detect an ascending car overspeed condition of not greater than 10% higher than the speed that the car governor is set to trip.
 - b. The device, when activated, shall prevent operation of the car until the device is manually reset.
 - c. The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.

H. Unintended Car Movement Protection Device

1. Provide a device to prevent unintended car movement away from the landing when the car and hoistway doors are not closed and locked.
 - a. The device shall prevent such movement in the event of failure of:
 - 1) The electric driving machine motor.
 - 2) The brake.
 - 3) The machine shaft or shaft coupling.
 - 4) Machine gearing.
 - 5) Control system.
 - 6) Any component upon which the speed of the car depends.
 - 7) Suspension ropes and the drive sheave of the traction machine are excluded.
 - b. The device shall prevent operation of the car until the device is manually reset.
 - c. The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.

I. Emergency Brake

1. Provide a mechanical device, independent of the normal braking system, that will stop the elevator should it overspeed or move in an unintended manner.
2. The device used may be arranged to apply force to the car or counterweight rails, suspension or compensation ropes, drive sheave or brake drum.
3. The emergency brake shall be provided with a marking plate indicating the range of total masses (car with attachments and its load) for:
 - a. The range of speeds at which it is set to operate.
 - b. The criteria such as rail lubrication requirements that may be critical to the performance.

2.5 HOISTWAY EQUIPMENT

A. Guide Rails / Inserts / Brackets (Where existing guide rails are being re-used)

1. Provide machined, standard size steel "T" section guide rails with tongue and grooved joints for the car and counterweight. Use not less than 15.0-pound car rails.
2. Guide rails shall match existing for the extension of travel.
3. Use not less than 3/4" thick machined steel fishplates to form rail joints. Connect rails to fishplate with four (4) bolts.
4. The section modulus and moment of inertia of the fishplates shall not be less than that of the rail. Connect rails to fishplate with four (4) bolts.
5. For concrete and concrete block hoistways furnish rail brackets and provide inserts and an insert location drawing to Construction Manager or General Contractor.
6. Brackets shall be used to support the rails from the hoistway framing and/or inserts.
 - a. The rails shall be attached to the brackets by heavy clamps or clips.
 - b. Bolting or welding rails to brackets shall only be allowed in certain instances.
 - c. Do not attach brackets to the top flange of hoistway framing steel.
7. Provide rail backing where the vertical distance between support framing is greater than 14'-0" and no intermediate support framing is shown on the drawing.
8. All guide rails shall be erected plumb and parallel to a maximum deviation of 1/8 inch (plus or minus 1/16 inch).
9. Provide oversized steel members and brackets for the rails where the distances exceed the manufacturer's standard dimensions.

B. Guide Rails / Inserts / Brackets (Reuse where existing, provide new for travel extension and new elevator)

1. Existing car and counterweight guide rails, fish plates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
 - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
 - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.

- b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.
 3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
 4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.
- C. Guide Rails / Inserts / Brackets (Where new are being provided)
 1. Provide machined, standard size steel "T" section guide rails with tongue and grooved joints for the car and counterweight. Use not less than 15.0-pound car rails.
 2. Use not less than 3/4" thick machined steel fishplates to form rail joints. Connect rails to fishplate with four (4) bolts.
 3. The section modulus and moment of inertia of the fishplates shall not be less than that of the rail. Connect rails to fishplate with four (4) bolts.
 4. For concrete and concrete block hoistways furnish rail brackets and provide inserts and an insert location drawing to Construction Manager or General Contractor.
 5. Brackets shall be used to support the rails from the hoistway framing and/or inserts.
 - a. The rails shall be attached to the brackets by heavy clamps or clips.
 - b. Bolting or welding rails to brackets shall only be allowed in certain instances.
 - c. Do not attach brackets to the top flange of hoistway framing steel.
 6. Provide rail backing where the vertical distance between support framing is greater than 14'-0" and no intermediate support framing is shown on the drawing.
 7. All guide rails shall be erected plumb and parallel to a maximum deviation of 1/8 inch (plus or minus 1/16 inch).
 8. Provide oversized steel members and brackets for the rails where the distances exceed the manufacturer's standard dimensions.
 9. Provide isolation type car and counterweight rail brackets at all locations.
 - a. Design the brackets to isolate the rails from the building structure through the use of neoprene sleeves, bushings and pads as manufactured by Mason Industries or approved equal. Provide details for review.
- D. Counterweight Assembly (Reuse on existing elevators)
 1. The existing counterweight assembly shall be refurbished to as new condition and reused.
 2. Individual counterweight frame members shall be inspected for any indication of damage and to determine if the overall assembly is twisted, racked, or otherwise distorted.

- a. All fastenings between counterweight frame members shall be individually examined, tightened and if necessary renewed.
 - b. In case any of these conditions are found to exist, the Contractor shall immediately inform the Consultant about the exact nature of the problem and undertake whatever corrective action the Consultant may deem appropriate to remedy the situation.
 3. The amount of filler weight placed within the counterweight frame shall be adjusted so the weight of the entire counterweight assembly is equal to that of the renovated elevator car, plus 40-42% of its rated loading capacity unless otherwise required by a manufacturer where new hoisting machinery is employed.
 - a. Filler weights shall be held securely in place at all times with tie rods passing through holes in both the weights and the counterweight frame with tie rods secured on each end with double lock nut and a cotter pin arrangement.
 4. The existing 2:1 rope sheave mounted to the counterweight frame shall be washed clean of accumulated grease and oil, then examined for any indication of bearing or bearing seal failure.
 - a. Bearings which are found to be worn or emit unusual noises, vibration, heat, or other unfavorable characteristics shall be replaced.
 - b. Defective grease retention seals shall be replaced.
 - c. Provide means to ensure that hoist ropes cannot jump out of their respective grooves in case of a slacken-rope condition.
- E. Counterweight Assembly / Frame (New Passenger Elevator)
1. Counterweight shall consist of a steel frame welded or bolted together and necessary steel sub-weights.
 - a. Sub-weights shall be held within the frame by not less than 2 tie-rods passing through holes in all weights with rods equipped with locknuts, secured by washers and cotter pins at each end.
 - b. The counterweight shall be equal to the weight of the elevator car and approximately 40% of the contract (specified) capacity.
 - c. Provide the required pit counterweight guard where no compensation is used.
 - d. Where a counterweight is a full located between elevators, provide a guard between the counterweight and the adjacent elevator extending the full height of the shaft as required by Code.
 - e. The bottom of the counterweight shall have a buffer striking plate and means to attach knock-off blocks to compensate for varying rope length.
 - f.

F. Roller Guides (Reuse on existing elevators)

1. The existing roller guide assemblies shall be retained and rebuilt for new.
 - a. Replace all worn rollers, bearings, shafts, pivot pins, tensioning devices, shock absorbers and adjustment hardware.
 - b. Realign guide stands to frame mountings.
 - c. Reset roller tensioning in conjunction with static balancing of the car enclosure after cab or other apparatus are installed.
 - d. Replace roller guide assemblies as necessary to meet the performance criteria specified herein.
2. Contractor may provide new roller guide assemblies, of equal or greater quality, in lieu of rebuilding the existing, as part of the base bid subject to the approval of the Consultant. Costs associated with replacement shall also be included in the base bid cost.

G. Roller Guides (For New Passenger Elevator)

1. Provide roller guide shoes with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car and counterweight frame.
 - a. Roller guides shall consist of a set of sound reducing polyurethane wheels in precision bearings held in contact with the three finished rail surfaces by adjustable stabilizing springs.
 - b. The bearings shall be sealed or provided with grease fittings for lubrication.
 - c. Equip roller guides with adjustable stops to control postwise float.
 - d. Fit the top car roller guides with galvanized, painted or powder coated steel guards.

H. Hoist Ropes

1. Provide coated steel belts with steel cords embedded in polyurethane.
 - a. Fastenings shall be accomplished by use of individual tapered sockets with adjustable shackles.
 - b. General design requirements for rope shackles and the method of securing wire rope shall conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.

I. Governor Rope

1. Pre-formed wire rope specifically constructed for elevator applications, shall be provided for governor ropes.
 - a. Rope shall be traction steel or iron in accordance with OEM design requirements.

- b. Rope diameter and method of fastening shall be in accordance with ASME A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.
- J. Electrical Conduit / Wiring / Traveling Cable
1. Electrical wiring shall be provided.
 - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
 - b. Electrical wiring provided for hoistway interlock shall be of a flame retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
 - c. Each run of electrical conduit or duct shall contain no less than 10% spare wires and, in any case, no fewer than two (2) spare wires.
 - d. Crimp-on type wire terminals shall be used where possible.
 2. New Traveling cable shall be provided.
 - a. Each traveling cable shall be provided with a flame and water resistant polyvinyl chloride jacket.
 - b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
 - c. Each traveling cable shall contain no less than 10% spare wires.
 - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
 - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.
 - f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20 gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
 - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
 - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the "as built" wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
 - h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of 30x the cable diameter is provided.
 - i. Pre-hang the cables for at least 24 hours with ends suitably weighted to eliminate twisting during operation.
 3. Rigidly supported EMT conduit, flexible metal conduit and galvanized steel trough shall be utilized throughout the hoistway.

- a. Both EMT and flexible conduit shall be connected on either end by use of compression fittings and secured in place with metal clamps sized in accordance with the diameter of conduit utilized.
 - 1) Wire or plastic wire ty-raps shall not constitute an acceptable means of fastening.
- b. The use of flexible metal conduit shall be limited to runs not greater than 3' in length.
- c. All abandoned or unused electrical conduit shall be removed from the hoistway.
- d. Existing conduit and wiring duct may be reused if suitable for the application.
 - 1) Reuse of existing conduit/duct shall be at the discretion of the Consultant.

K. Normal and Final Terminal Stopping Devices

1. Provide normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel, independent of the operating devices, final terminal stopping device and the buffers.
2. Provide final terminal stopping devices to stop the car and counterweight automatically from the speed specified within the top clearance and bottom overtravel.
3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the car.
 - a. Terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
4. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

2.6 PIT EQUIPMENT

A. Car and Counterweight Buffer (Reuse)

1. Existing car and counterweight buffers shall be reused.
 - a. Pit channels, related supports and fastenings shall be inspected for damage and to determine if the structural integrity of any component is diminished by the affects of rust or other unfavorable conditions.

- 1) In the event defects are found, the Contractor shall immediately inform the Consultant and undertake whatever repair and/or replacement the Consultant may deem appropriate.
- b. Surface rust shall be removed from all reused components.
- c. Where hydraulic buffers are used:
 - 1) Buffer plunger shall be honed free of all surface rust and blemishes and provided with a protective coating of machinist bluing.
 - 2) The hydraulic fluid reservoir on each buffer shall be drained, flushed and refilled with fresh oil. The grade and amount of fluid added to each buffer shall conform to O.E.M. specification.
- d. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
- e. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby in accordance with ASME A17.1 as may be modified by, and/or in addition to codes and standards accepted by the AHJ.
- f. The buffer shall undergo testing in accordance with ASME A17.1 Code as modified by, and/or in addition to codes and standards accepted by the AHJ.

B. Car and Counterweight Buffers (New Passenger Elevator)

1. Provide buffer with necessary blocking and horizontal steel braces under the car and counterweight.
2. Provide spring type buffers for elevators with operating speeds of up to and including 200 fpm. Use oil buffers for elevators with operating speeds over 200 fpm.
3. Oil buffer shall bring the car and counterweight to rest from governor tripping speed at an average rate of retardation not exceeding gravity (32 ft/s^2).
4. Oil buffer shall be of the spring return type and shall have means of checking oil supply level.
5. Use reduced stroke buffer with associated terminal slowdown devices where runby is restrictive.
 - a. Buffer and emergency terminal slowdown device shall operate in accordance with applicable codes.
6. The buffer shall be tested and approved by a qualified testing laboratory.
7. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
8. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby.
9. Support buffers from the pit floor level with all required blocking and bracing steel members.
10. Coordinate the installation of the buffer inspection platform and ladder with the Architect and Construction Manager.

C. Governor Rope Tension Assembly

1. Reuse governor rope tension assemblies on existing elevators
2. Provide a new governor rope tension assembly for the new passenger elevator.
 - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
 - 1) Springs used to develop the tension are not acceptable.
 - b. The sheave shall be of proper diameter and set directly plumb with the governor rope drop to prevent the rope from pulling off of the sheave at an angle.
 - c. Lubrication fittings shall be provided on the assembly.
 - d. The assembly shall have necessary rope guards to prevent accidental contact of the rope/sheave by service personnel and to prevent the governor rope from jumping off of the sheave.

D. Pit Stop Switch

1. The elevator pit for the new passenger elevator shall be provided with a push/pull or toggle switch that is conspicuously designated "EMERGENCY STOP" and located so as to be readily accessible from the hoistway entrance on the lowest landing served at a height of approximately 18" above the floor.
 - a. This switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
2. Existing stop and/or pit door switch conforming to the requirements set forth herein may be refurbished to as new condition and reused subject to approval of the Consultant.

2.7 HOISTWAY ENTRANCES

A. Hoistway Entrances (At New Landings and New Passenger Elevator)

1. Provide new frames at new openings constructed of 16-gauge sheet steel. Provide standard bolted type construction having matching end caps. Provide 2" wide square profile.
2. Finish new door frames in brushed stainless steel.

B. Doors - The doors shall be constructed of 16-gauge sheet steel, not less than 1-1/4" thick, reinforced to accept hangers, interlocks or door closers.

1. Equip all new hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.
2. New door panels shall be finished in brushed stainless steel
3. New entrances shall bear 1 ½ hour label of Underwriters Laboratories, Inc.

4. Provide each new door panel with two removable laminated plastic composition guides, arranged to run in sill grooves with a minimum clearance, replaceable without removing the door from the hangers and incorporating a steel fire stop.
5. Provide the leading edge of center opening door panels with continuous black rubber astragal bumper strips.
 - a. The strips shall be relatively inconspicuous when the doors are closed and shall be easily replaced.
6. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
7. Provide rubber bumpers at the top and bottom of the door to stop them at their limit of travel in opening direction.
8. Sills - Provide narrow-type, extruded aluminum sills with the nosing approximately one (1) inch deep and running the full length of door travel.
 - a. The sills shall be at least 3/8 inch thick.
 - b. The wearing surface shall be of a non-slip type.
 - c. Rigidly secure the sills to the building construction by means of steel sill support brackets or blocking with necessary metal shimming or adjustments.
 - d. Sill for all new landings shall be extruded aluminum type
 - e. If formed sheet steel struts are used, the structural properties of formed struts shall match or exceed the structural properties of 3" x 3"x 1/4" steel angle.
 - f. Extend the struts from top of sill to either the bottom of floor beam or intermediate framing above.
 - g. Bolt struts in place with not less than two (2) bolts at each end.
 - h. Strut clip angles or brackets shall have a thickness not less than the thickness of the supported strut.
9. Track Support - 3/16-inch-thick steel track support plate shall extend between and be bolted to the vertical steel struts with no less than two (2) bolts at each end.
10. Track Covers - 14 gauge steel cover plates shall extend the full travel of the doors.
 - a. Covers shall be made in sections for service access to hangers, sheaves, tracks and interlocks.
 - b. The sections above the door opening shall be movable from within the elevator car.
 - c. Cover fastening devices shall be non-removable from the cover.
11. Fascias - 14 gauge steel fascia plates shall extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
 - a. Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.

12. Toe Guards – Provide 14 gauge steel toe guards to extend 12 inches below any sill not protected by fascia.
 - a. The toe guards shall extend the full width of the door and shall return to the hoistway wall at a 15-degree angle and be firmly fastened.
 13. Dust Covers – Provide 14 gauge steel dust covers to extend 6 inches above any header not protected by fascia.
 - a. The dust covers shall extend to a full width of travel of the doors, return to the hoistway wall at a 15-degree angle and be firmly fastened.
- C. Hoistway Entrances (Reuse at existing landings)
1. Hoistway entrance sills, sill supports, entrance frames, headers and header supports shall be reused and refurbished.
 - a. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced as necessary.
 - b. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
 - 1) Reinforce fascia to allow not more than ½” of deflection.
 - 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
 - c. Provide 14-gauge steel toe guards that extend 12” below any sill not protected by fascia.
 - 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a 15-degree angle and be firmly fastened.
 - d. Remove oil, dirt and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.
- D. Slide Type Hoistway Entrance Door Panels (Reuse at existing landings)
1. Hoistway entrance door panels shall be reused and refurbished.
 - a. Provide each door panel with two removable laminated plastic composition guides, arranged to run in existing sill grooves with a minimum clearance.

- 1) The guide mounting shall permit their replacement without removing the door from the hangers.
 - 2) A steel wear indicator shall be enclosed in each guide.
 - b. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
 - 1) Astragal shall be relatively inconspicuous when the doors are closed.
 - 2) Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
 2. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
 3. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.
 - a. The key hole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
 - b. Where applicable, plug the abandoned hoistway door access hole in each door panel, secured from the hoistway side of the door, finished to match existing or as otherwise directed by the Owner/Architect.
 4. Where conditions warrant, or where otherwise required by code, equip all hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.
- E. Tracks / Hangers / Closers / Interlocks (Reuse at existing landings)
1. The existing hoistway door hangers, tracks and interlocks shall be reused and rehabilitated.
 2. Roller/hanger assemblies, consisting of the roller and eccentric, shall be cleaned, degreased and adjusted for proper operation.
 3. Up-thrust shall be minimized through adjustment of the eccentric roller.
 4. Worn rollers and eccentrics shall be replaced where needed.
 5. Thoroughly clean the track of all dirt and grease accumulations to provide a smooth surface.

6. The interlock shall be disassembled and checked for contact wear.
 - a. Worn contacts shall be replaced as required.
 - b. The interlock wiring shall be replaced with new.
 - c. The entire assembly shall be adjusted and checked for proper operation.
 7. Closers at each entrance shall be cleaned and pivot pins lubricated. Worn and/or defective sill closers as well as noisy spirators shall be replaced as required to maintain self-closing of the hoistway doors should the elevator leave the floor for any reason with the car door open.
- F. Hoistway Door Bottom Guides / Safety Retainers
1. The bottom of each side sliding type hoistway door panel shall be equipped with a minimum of two (2) guiding members.
 - a. Metal mounting angles shall be secured to the integral panel frame structure; and when conditions warrant, additional external metal support plates or angles shall be installed to ensure the integrity of the panel frame is not compromised.
 - b. Guides shall be manufactured of low friction non-metal material with sufficient strength to withstand forces placed on door panels per ASME A17.1 Standards.
 - c. Each guide assembly shall incorporate a steel wear indicator and be so designed to permit sliding member replacements without removal of door panel(s) from top hanger devices.
 - d. Panels shall be hung with a maximum vertical clearance of 3/8 inch between top of sill and bottom of panel and the guide shall engage the sill groove by not less than 1/4 inch.
 2. The bottom of each side sliding type hoistway door panel shall be equipped with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
 - a. A metal reinforcement (12 gauge stainless or galvanized steel) shall be installed between the two (2) primary guiding members (a.k.a. "Z" bracket).
 - b. The reinforcement shall be designed with a minimum length of 8 inches or the maximum possible length that will fit between the primary members and a minimum overall height of 2.5 inches secured on the internal face of the door panel. (Hoistway side)
 - c. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area 12 inches x 12 inches at the approximate center of the door panel.

2.8 CAR EQUIPMENT / FRAME

A. Car Frame (Reuse Existing)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
 - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.
6. The 2:1 sheave shall be refurbished:
 - a. The sheave shall be washed clean of accumulated grease and oil.
 - b. Bearings which are found worn or to emit unusual noises, appreciable vibration, excessive heat, or other unfavorable characteristics shall be replaced.
 - c. Defective grease retention seals shall be replaced as needed.
 - d. Provide means to ensure that hoist ropes cannot jump out of their respective grooves in case of a slack rope condition.

B. Car Platform (Reuse existing)

1. The existing platform shall be modified to accommodate the new apparatus specified herein.
 - a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
 - b. Top of platform shall be refurbished with a marine grade plywood set to receive new finished floor covering as selected by Owner.
 - c. Where necessary, provide a new safety access hole ring and cover assembly to match selected cab finishes.
 - d. At Contractor's option or when conditions warrant, provide a totally new platform in lieu of repairs, modifications and upgraded specified above.

C. Car Safety (Reuse existing)

1. The existing governor actuated car safety device shall be retained, overhauled and upgraded for current code compliance.
2. Readjust safety for proper operation in accordance with current ASME A17.1 design standards.
3. Check the existing safety operated switch (plank-switch) for proper adjustment and operation.
4. A new safety shall be provided where the existing is not suitable for reuse due to overall condition or in conjunction with an increase in the elevator speed or full load capacity.

D. Car Frame and Platform (New Passenger Elevator)

1. The car frame shall be made of steel members, with the required factor of safety.
2. The car platform shall consist of a steel frame with necessary steel stringers, all securely welded together.
3. The frame and platform shall be so braced and reinforced that no strain will be transmitted to the elevator car.
 - a. Provide platform with two (2) layers of 3/4" thick marine grade plywood.
 - b. Cover the underside of the car platform with sheet steel.
4. The support frame shall carry rubber pads on which the platform shall rest without any connection to the steel frame for sound and vibration isolation.
5. Provide extruded aluminum thresholds having non-slip surface, guide grooves.
6. Sound isolate all passenger elevator platforms with vibration isolation pads. The support frame shall carry rubber pads on which the platform shall rest without any connection to the steel frame.
7. Recess the passenger elevator platforms to receive finished flooring as selected by the Architect and specified under another section of their specification.
8. The car frame shall be sized for an 8'-0" overall cab height.
9. Design the elevator car frame and platforms for elevators for a Class A freight loading.

E. Car Safety (New Passenger Elevator)

1. Provide a governor actuated mechanical safety device mounted under the car platform and securely bolted to the car sling.
2. The car safety shall be sized for the capacity and speed noted herein.
 - a. When tripped, the safety mechanism shall engage the rails with sufficient force to stop a fully loaded car with an average rate of retardation within the limits given in A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.
3. Install a car safety marking plate of corrosion resistant metal and, in addition to the data required by Code, indicate the manufacturer's name and manufacturer's catalog designation number for safety.

4. Make provisions to release the car safety. In no event shall the safety be released by downward motion of the car. Raising the car to reset the safety shall be allowed.
5. Provide an electrical safety plank switch that will interrupt the power to the hoist machine and apply the machine brakes when the safety is set.
- 6.

F. Automatic Leveling / Releveling / Positioning Device

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
 - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
 - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.

G. Top-of-Car Inspection Operating Station (New Passenger Elevator)

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:
 - a. A push/pull or toggle switch designated "EMERGENCY STOP" shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the "off" position.
 - b. A toggle switch designated "INSPECTION" and "NORMAL" to activate the top of car Inspection Service Operation.
 - c. Push button designated "Up", "Down" and "Enable" to operate the elevator on Inspection Service (the "Enable" button shall be arranged to operate in conjunction with either the "Up" or "Down" button).
 - d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

H. Load Weighing Device (New Passenger Elevator)

1. Provide means to measure the load in the car within an accuracy of $\pm 4\%$ of the elevator capacity.

2. Provide one of the following types of devices:
 - a. A device consisting of four strain gauge load cells located at each corner of the car platform and supporting a free floating car platform and cab with summing circuits to calculate the actual load under varying conditions of eccentric loading.
 - b. A strain gauge device located on the crosshead, arranged to measure the deflection of the crosshead and thus determine the load in the car.
 - c. A device consisting of four strain gauge load cells, supporting the weight of the elevator machine with summing circuits to calculate the actual load under varying conditions of load.
 - d. A device to measure the tension in the elevator hoist ropes and thus determine the load in the car.
3. Arrange that the output signal from the load weighing device be connected as an input to the signal and motor control systems to pre-torque of the hoisting machine motors where applicable.
4. Provide audible and visual signals in connection with the load weighing device when used as an "overload" device.

I. Emergency Exits

1. Ensure existing emergency exits operate as per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.
2. The top of all car emergency exits shall be so arranged that it can be opened from within the car by means of a keyed spring-return cylinder-type lock having not less than a five-pin or five-disk combination and opened from the top of the car without the use of a key.
3. No other key to the building shall unlock the emergency exit lock except access switch keys which may be keyed alike.
 - a. Keys shall be assigned in accordance with ASME A17.1 Group 1 Security requirements.
4. Seismic Zone 2 - The top emergency exit shall be provided with an electric contact so located as to be inaccessible from the inside of the car. The opening of the electrical contact shall limit the car speed to not more than 150 ft/min (0.76 m/s).

J. Master Door Power Operator System (Reuse on existing elevators))

1. The master electric power door operator shall be refurbished and adjusted.
2. The door shall be adjusted to operate at an average opening speed of 2 feet per second.
3. Automatic closing of the car and hoistway doors shall be required, and the closing speed shall be approximately 1foot per second.
 - a. The speed shall be reduced as required to limit the kinetic energy of the closing doors to the values permitted by the ASME A17.1 Code.

4. The door shall operate smoothly without a slam in both the opening and closing direction.
 5. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
 - a. The hoistway door shall continue to be self-locking and self-closing.
 - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.
 - c. Provide zone-lock devices as required by applicable local codes and ASME A17.1 standards.
 6. Thoroughly clean and fully rehabilitate the existing car door hangers and tracks for reuse with new or existing car door panel.
 - a. Replace hanging rollers where necessary with similar manufactured high-quality components.
 - b. Where conditions warrant, provide necessary new tracks.
 - c. New equipment shall be fully compatible with existing apparatus.
- K. Master Door Power Operator System – VVVF/AC
1. Provide a heavy-duty master door operator on top of the elevator car enclosure for power opening and closing of the cab and hoistway entrance door panels.
 2. Operator shall utilize an alternating current motor, controlled by a variable voltage, variable frequency (VVVF) drive and a closed-loop control with programmable operating parameters.
 - a. System may incorporate an encoder feedback to monitor positions with a separate speed sensing device or an encoderless closed-loop VVVF-AC control to monitor motor parameters and vary power applied to compensate for load changes.
 3. The type of system shall be designated as a high speed operator, designed for door panel opening at an average speed of 2.0 feet per second and closing at approximately 1.0 foot per second.
 - a. Reduce the closing speed as required to limit kinetic energy of closing doors to within values permitted by ASME A17.1 as may be adopted and/or modified by the AHJ.
 4. The door shall operate smoothly without a slam or abrupt motion in both the opening and closing cycle directions.
 - a. Provide controls to automatically compensate for load changes such as:
 - 1) Wind conditions (stack effect)
 - 2) Use of different weight door panels on multiple landings
 - 3) Other unique prevailing conditions that could cause variations in operational speeds.

- b. Provide nudging to limit speed and torque in conjunction with door close signaling/closing and timing devices as permitted by ASME A17.1 as may be adopted and/or modified by the AHJ. Nudging shall be initiated by the signal control system and not from the door protective device.
 5. In case of interruption or failure of electric power from any cause, the door operating mechanism shall be so designed that it shall permit emergency manual operation of both the car and corridor doors only when the elevator is located in the floor landing unlocking zone.
 - a. The hoistway door shall continue to be self-locking and self-closing during emergency operation.
 - b. The door operator and/or car door panel shall be equipped with safety switches and electrical controls to prevent operation of the elevator with the door in the open position as per ASME A17.1 Code Standards.
 - c. Provide zone-lock devices as required by ASME A17.1 as may be adopted and/or otherwise modified by the AHJ.
 6. Construct all door operating levers of heavy steel or reinforced extruded aluminum members, designed for stress and forces imposed on the related parts, linkages and fixed components during normal and emergency operation functions.
 - a. All pivot points shall have either ball or roller-type bearings, oilite bronze bushings or other non-metallic bushings of ample size.
 7. Provide operating data / data tag permanently attached to the operator as required by applicable code and standards.
- L. Car Door Zone Lock Restrictor (New on Existing Equipment)
1. Retrofit the existing car door operator to incorporate a car door zone lock restrictor.
 2. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
 - a. The hoistway door shall continue to be self-locking and self-closing.
 - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.
- M. Car Door Gate Switch (New Passenger Elevator)
1. Provide a car door electrical safety (gate) switch that connects directly to the car door track.
 - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.

N. Door Reopening Device (Reuse on existing elevators)

1. The existing multi-beam infrared door reopening device shall be refurbished and reused in place.
2. The device shall be cleaned and adjusted for proper operation.
3. Replace missing or damaged lens and/or controller cover where necessary.
4. Flexible connecting cable shall be replaced with new and properly suspended to prevent excessive bending.
5. At the Contractor's discretion, a new infrared door protection system may be installed in lieu of rehabilitating / reusing the existing unit.

O. Door Reopening Device / "3D" (New Passenger elevator)

1. Provide a combination infrared curtain and 3D door protection system.
2. The door shall be prevented from closing and will reopen when closing if any one of the curtain light rays is interrupted or should an object enter the 3D detection zone.
3. The door shall start to close when the protection system is free of any obstruction.
4. The infrared curtain and 3D zone protective system shall provide:
 - a. Protective curtain field not less than 71" above the sill.
 - b. 3D protective zone field not less than 61" above the sill.
 - c. Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
 - d. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
 - e. Self-contained, selectable 3D zone timeout feature to allow for closing at nudging speed with audible signal.
 - f. Automatic turning-off of the 3D zone in the event of three (3) consecutive 3D triggers.
 - 1) Light curtain shall continue to operate after 3D system timeout.
 - g. Selectable control of the 3D zone operation on an "always-on" or "as doors close" basis.
 - h. Controls to shut down the elevator when the unit fails to operate properly.

2.9 FINISH / MATERIALS / SIGNAGE

A. Material, Finishes and Painting

1. General

- a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
- b. Rolled Steel Floor Plate: ASTM A786
- c. Steel Supports and Reinforcement: ASTM A36
- d. Aluminum-alloy Rolled Tread Plate: ASTM B632
- e. Aluminum Plate: ASTM B209
- f. Stainless Steel: ASTM A167 Type 302, 304 or 316
- g. Stainless Steel Bars and Shapes: ASTM A276
- h. Stainless Steel Tubes: ASTM A269
- i. Aluminum Extrusions: ASTM B221
- j. Nickel Silver Extrusions: ASTM B155
- k. Bronze Sheet: ASTM B36(36M) alloy UNS No. C2800 (Muntz Metal)
- l. Structural Tubing: ASTM A500
- m. Bolts, Nuts and Washers: ASTM A325 and A490
- n. Laminated / Safety Tempered Glass: ANSI Z97.1

2. Finishes

a. Stainless Steel

- 1) Satin Finish: No. 4 satin, long grain
- 2) Mirror Finish: No. 8 non-directional mirror polished

b. Sheet Steel:

- 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer
- 2) Finish Paint: Two (2) coats of low sheen baked enamel, color as selected by the Architect.
- 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.

3. Painting

- a. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalomania or stencil type.
- b. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.

B. Designation and Data Plates, Labeling and Signage.

1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
2. Provide floor designation plates at each elevator entrance, on both sides of the jamb at a height of 60 inches to center line of plate.
 - a. Floor number designations and Braille shall be 2" high, 0.03" raised and stud mounted.
3. Identify the designated medical emergency services elevator with 3" high international symbol at each elevator entrance on both sides of the jamb.
4. Provide raised designations and Braille markings to the left of the car call and control buttons of the car operating panel(s).
 - a. Designations shall be a minimum of 5/8" high, 0.03" raised and stud mounted.
5. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.
6. Architect shall select the designation and data plates from manufacturer's premium line of plates.

2.10 FIXTURES / SIGNAL EQUIPMENT

A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
3. Mount passenger elevator fixtures with tamperproof fasteners. The screw and key switch cylinder finishes shall match faceplate finish.
4. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
5. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy.

B. Main Car Operating Panel

1. Provide a new main car operating push button panel on the inside front return panel of all elevators car.
2. Car operating panel shall be incorporated in the swing-front return of the elevator cab.

- a. Coordination with car front manufacturer shall be the responsibility of the Elevator Contractor.
3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
4. The operating panel shall include:
 - a. A call button for each floor served, located not more than 48" above the cab floor.
 - b. "Door open" / "Door close" buttons.
 - c. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
 - d. "Emergency Stop" switch per local law located at 35" above the cab floor.
 - e. Self-dialing, hands-free telephone and / or intercom with call acknowledging feature and A.D.A. design provisions.
 - f. Three (3) position firefighter key operated switch, call cancel button and illuminated visual/audible signal system with mandated signage engraved per ASME A 17.1 Standards as modified by the AHJ.
 - g. Components for Emergency Hospital Service and Priority Service
5. Locked Firemen's' Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
 - a. Automatic opening of the locked cabinet door may be provided with signals initiated by the fire detection and alarm system where approved by the Authority Having Jurisdiction.
6. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
 - a. Independent service switch with associated operating buttons and signal indicators.
 - b. Light switch.
 - c. Fan switch.
 - d. G. F. I. duplex receptacle.
 - e. Emergency light test button and indicator.
 - f. Inspection Service Operation key switch.
 - g. Port for hand-held service tool where applicable.
 - h. Dimmer for cab interior lighting.
7. Car operating panel shall incorporate:
 - a. An integral (no separate faceplate) digital L.E.D. floor position indicator
 - b. Emergency light fixture (without a separate faceplate) and black-filled engraved unit I.D. number or other nomenclature, as approved by Owner
 - c. A "No Smoking" advisory and the rated passenger load capacity.

8. Post Inspection Certificate behind an opening in the car operating panel or behind flush window in service cabinet door that is fitted with a flush-mounted clear Plexiglas without a frame. Opening shall be sized for displaying a standard issued State of Maine operating certificate
- C. Car Position Indicator
1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.
 - a. Provide 2" high, 10-segment LED type position indicator with direction arrows, integral with the car operating panel.
 - b. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
 - c. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
 - d. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.
- D. Hospital Emergency Service Car Operating Devices
1. The car control key switch shall be of the two (2) position type with key removal in the "OFF" position only.
 2. Provide an illuminated advisory indicator with audible signal in the car operating panel.
- E. Corridor Push Button Stations / Riser (For new Landings)
1. A riser of push button signal fixtures shall be provided on all floors.
 2. Each signal fixture shall consist of the following:
 - a. A flush-mounted faceplate.
 - b. Illuminating tamper-resistant push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
 - c. A recessed mounting box, electrical conduit and wiring.
 - d. Key switches for emergency hospital service
 3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
 4. Provide a new main floor hall push button station including the following components:
 - a. Illuminating call buttons.
 - b. Firefighters recall switch with visual signal and engraved operating instructions.
 - c. Emergency power visual signal
 - d. Code required pictograph

- e. Key switches for emergency hospital service and emergency priority service
 - 5. Push button signal fixtures shall be installed at a centerline height of 42" above the floor and shall be installed both plumb and flush to the finished wall.
 - a. Standardize the final distance on all floors.
 - 6. New fixture faceplates shall be installed in adjacent to the entrance frame on front wall.
- F. Corridor Push Button Stations – Existing Landings/ Reuse Back Boxes
- 1. Push button signal fixtures shall be provided on each landing.
 - 2. Each signal fixture shall consist of:
 - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
 - b. A recessed mounting box, electrical conduit and wiring.
 - 3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
 - 4. Include firefighter key switch in the main lobby level station or other designated recall landing.
 - 5. Where existing fixtures are located greater than 48" above the floor:
 - a. The existing back boxes shall be retained and used to attach the oversized fixture faceplate to locate the new buttons with a centerline between 35" and 48" above the finished floor.
 - 1) The Contractor has the option of providing a single oversized back box in lieu of retaining existing for faceplate attachment.
 - b. Standardize the new centerline distance on all floors.
 - 6. All cutting, patching, grouting and/or plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
 - a. Finished painting or decorating of wall surfaces shall be by Others.
 - 7. All faceplates shall be engraved with fire logo and "In Case of Fire Use Stairs" to help fill the void created by the use of oversized covers.
- G. Hospital Emergency Service Corridor Operating Devices [NYC]
- 1. A two-position key-operated corridor Hospital Emergency Service switch shall be provided at one or more landings to activate the special control function by authorized or designated personnel.

- a. The two-position switch shall be marked "NORMAL" and "HOSPITAL EMERGENCY SERVICE". Keys shall be removal only in the "NORMAL" position.
 2. The color of the Hospital Emergency Service switch halo, located in a corridor at the designated level(s) and inside the patient elevator operating panel, shall be "BLUE".
- H. Floor Position Indicator (Reuse)
1. The existing digital floor position indicator(s) shall be reused.
 - a. Replace damaged, clouded or missing lenses.
 - b. Interface displays for use with new signal control apparatus installed under the base scope of work.
 - c. Program the position indicators to accommodate new lanings being served
- I. Hall Direction Lanterns (New passenger elevator and new landings for existing elevators)
1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
 - a. Design the lantern to match existing with up and down indication at intermediate landings and a single indication at terminal landings.
 - b. Lanterns shall sound once for the up direction and twice for the down direction.
 - 1) Provide an electronic chime with adjustable sound volume.
 - c. Provide adjustable signal time (3 to 10 seconds, with 1 second increments) to notify passengers which car shall answer the hall call and preset per ADAAG distance standards.
 2. Main Lobby fixture shall incorporate a 2" high LED floor position indicator in the hall lantern fixture with direction arrows located on both sides of the indicator.
- J. Hall Direction Lanterns (Reuse at existing landings)
1. The existing hall lantern/gong fixtures shall be reused.
 - a. Intermediate floor fixtures shall have both "up" and "down" indicators.
 - b. Existing terminal floor hall lanterns shall be removed and reinstalled at the new upper terminal landings.
 - c. A new multi-stroke electronic chime shall be incorporated in the existing lantern fixture.
 - d. Clean each faceplate of rust or paint.

2. New fixtures duplicating existing materials and finishes shall be provided where existing fixtures have been modified and/or damaged beyond repair.

K. Hoistway Access Switch (New Passenger Elevator)

1. Install a cylindrical type keyed switch at top terminal in order to permit the car to be moved at slow speed with the doors open to allow authorized persons to obtain access to the top of the car.
2. Where there is no separate pit access door, a similar switch shall be installed at the lowest landing in order to permit the car to be moved away from the landing with the doors open in order to gain access to the pit.
3. Locate the switch in a separate fixture with a flush cover plate at a height of 78" above the finished floor.
4. This switch is to be of the continuous pressure spring-return type and shall be operated by a cylinder type lock having not less than a five (5) pin or five (5) disc combination with the key removable only in the "OFF" position.
 - a. The lock shall not be operable by any key which operates locks or devices used for other purposes in the building and shall be available to and used only by inspectors, maintenance men and repairmen in accordance with A17.1 applicable Security Group.

L. Hoistway Access Switch (Existing Elevators)

1. Existing lower terminal hoistway access switches shall be retained in place.
2. Existing upper terminal hoistway access switches shall be removed and reinstalled at new upper terminal landings. Patching of opening left behind shall be performed by others.

M. Fire Command Panel

1. Provide a Control Panel to be located in the building Fire Command Center.
2. Provide brushed stainless steel finish faceplate with tamperproof screws.
3. The panel shall include:
 - a. 2" high LED position and direction indicators.
 - b. Remote fire recall switches for each elevator group, including engraved operating instructions and visual signal.
 - c. Emergency power visual signal.
 - d. Car to Lobby key switches for each elevator

N. Remote Monitoring System (EMIS)

1. Provide a desk type interactive computer-based Elevator Management Information System (EMIS) with multi-display terminals for all traction elevators. The system shall include:
 - a. The desk type interactive computer-based Elevator Management Information System (EMIS) shall have:
 - 1) A desktop PC with the most current high-performance processor, Windows 7 (64-bit version) or later operating system
 - 2) A 23" flat panel LED HD monitor
 - 3) A color laser printer with 16 ppm B/W and 12 ppm color printing speed
 - 4) A 104-key USB keyboard
 - 5) Locate the system as directed by the Architect
 - 6) Locate the system as directed by the Owner
 - 7) Locate a 17" LED monitor and computer in each machine room for monitoring and trouble shooting of the elevator equipment.
2. Design the system with split screen to display the information in graphic or tabular form as follows:
 - a. Graphic Status Display: Display of an elevation representation of every car in a group.
 - 1) Floor status
 - 2) Group operational mode
 - 3) Car status
 - 4) Hall calls
 - 5) Date and time, building and group identification
 - b. The information indicated above (except for registered hall and car calls and floor security status) shall be displayed on screen simultaneously for each group connected to the EMIS for tabular format.
 - c. EMIS shall monitor various discrete signals from the elevator system and retain a log of up to the last 200 alarms/events.
 - d. The system shall display current status on screen and, from the keyboard, shall allow modification of the security status of each car in the group, including car and hall call registration security lock-out.
3. The EMIS shall be capable of sending information to and receiving instructions from the building security computer (BMS).
4. The system shall provide the ability to use the keyboard to initiate and display interactive elevator operations, including but not limited to the following:
 - a. Display faults and events
 - b. Display alarm messages
 - c. Car and hall calls
 - d. Modifications of some elevator parameters such as door times, etc.

- e. Any other special operations.
 - f. Security car and hall push button locks shall be controlled on a per unit, per landing, per car or per group basis with fire control over-rides per code.
5. The system shall allow ability to view and print performance data for each group connected to the EMIS through the following screens:
- a. Car operations screen showing the number of door operations, door reversals and car runs.
 - b. Car timing averages screen, showing averages for flight time, door opening and closing.
 - c. Hall calls screen shall show per group basis the number of hall calls in each direction broken down into the number answered in specified intervals.
 - d. Landing summary screen.
 - e. Any additional screens required.
6. The system shall provide the capability to view various reports generated from the data.
- a. The following information for each group shall be shown in reports:
 - 1) Total number of hall calls (up/down)
 - 2) Average waiting times (up/down)
 - 3) Maximum wait and time at which it occurred
 - 4) Number of car calls per car
 - 5) Number of hall and car calls per landing (up/down)
 - 6) Average waiting time per landing
 - 7) Histogram of registration times
 - 8) For preset, adjustable time intervals for each car, a summary will be given of:
 - a) The number of door operations
 - b) Car runs
 - c) Averages of flight times and door times
 - 9) Record of every car and hall call registered
 - 10) Record of all events and alarms.

2.11 CAR ENCLOSURES

A. Existing Elevator Cab Enclosures

- 1. Provide new car doors for all existing elevators finished in brushed stainless steel.
- 2. Provide new swing return panels from 14 ga. brushed stainless steel for all existing elevators, to accommodate new car signal fixtures specified.
- 3. Provide new car transoms from 14 ga. brushed stainless steel

B. Elevator Cab Enclosure (New Passenger Elevator)

1. Car Shell and Panels

- a. The car sides and rear wall shall be constructed of No. 14 gauge furniture steel.
- b. Apply sound deadening material to the outside face of the shell.
 - 1) Sound deadening material shall be of the rubberized type and shall be of either brush or spray-on consistency.
 - 2) Material shall be applied to a minimum of 1/8" thickness.
- c. The car top shall be of no less than No. 12 gauge sheet steel suitably braced to meet the requirements of the A17.1 Code.
- d. Top of car emergency exit shall include hinging and locking arrangements with electrical safety switch to prevent operation with door open.
 - 1) Attach the top of car exit to the dome of the cab via sash-chain or other suitable means, where the exit cover is not hinged or otherwise permanently attached to the dome.

2. Front Return Panels and Transom: Use 14 gauge furniture sheet steel with proper reinforcing to prevent oil canning.

- a. Swing front return panels shall have required cutouts for the car call buttons, keyed switches, indicators, emergency light fixture, cabinets and the specified special control and signaling devices.
 - 1) Provide concealed full height stainless steel piano hinges of sufficient strength to support the panel, without sagging, in the open position.
 - 2) The concealed locks shall secure the panel at two points with linkage that shall be free of vibration and noise when in the locked position.
 - 3) When locked in the closed position, the front return panel shall be in true alignment with the transom and base.
 - 4) Lock release holes shall be not more than 1/4" diameter and be located at the return side jamb of the panel.
 - 5) Engrave the elevator identification number and capacity, no smoking sign, firefighter instructions, and other code mandated instructions and caution signs directly in the front return panel. Applied panels are unacceptable.
- b. Transom shall be 14 gauge, and be reinforced and constructed the same as the front return panels.
- c. The wall panels shall be constructed of 3/4" thick marine grade plywood.
- d. Each panel section shall be faced with a selected laminate/veneer or other material and framed in 1/16" thick stainless steel or bronze.
- e. Frame members shall be separated by 1/2" thick polished metal trim and fitted with 3-1/2" by 3-1/2" polished metal plates at corners.

- f. Apply furniture steel or suitable laminate to shaft side of panels to prevent warping or other deformations.
 3. Cab Doors: Standard 1" thick, 14 gauge hollow metal flush construction, reinforced for power operation and insulated for sound deadening. Paint hatch side of doors black and face cab side with brushed stainless steel.
 - a. The door panels shall have no binder angles. All welds shall be continuous, ground smooth and invisible.
 - b. Drill and reinforce doors for installation of door operator hardware, door protective device, door gibs, etc.
 4. Base:
 - a. Provide a finished metal base with a 1/4" wide continuous vent slot above the base to allow the proper amount of air to infiltrate the cab based on the CFM of the exhaust fan and car interior size.
 - b. Prepare base to accept finished floor as selected by the Owner.
 5. Removable Wall Panels
 - a. Provide removable type wall panels, faced and edged in laminate to match existing elevators.
 6. Entrance Sill:
 - a. Provide car door entrance saddle using an [extruded aluminum sill.
 7. Suspended Veiling/Lighting:
 - a. Provide suspended ceiling and lighting to match existing.
 8. Flooring:
 - a. Provide finish floor covering to match existing
 9. Handrail:
 - a. Provide handrails to match existing.
 - b. Use three (3) points of attachment designed for interior access servicing with exterior support plates.
 10. Protection Pads:
 - a. Provide floor-to-ceiling vinyl pads for all wall surfaces with associated hanging hardware.
- C. Elevator Cab Enclosure Fan
1. Provide an exhaust type two-speed fan unit with cover grill, mounting accessories and necessary cab enclosure modifications.

- a. Fan unit shall include self-lubricating motor with housing rubber mounted for sound vibration isolation.
2. Provide a key switch in the elevator cab enclosure for control of fan unit.
3. Provide necessary wiring and approved conduit to properly connect fan unit with power source and control key switch.

2.12 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING

A. Battery Back Up Emergency Lighting Fixture and Alarm

1. Provide a self-powered emergency light unit.
 - a. Arrange two (2) of the cab light fixtures to operate as the emergency light system.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
 - a. The battery shall be rechargeable nickel cadmium with a 10-year minimum life expectancy. Mount the power pack on the top of the car.
 - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.
 - c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
 - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station
 - 2) The alarm button shall illuminate when pressed.
3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
4. The operation shall be completely automatic upon failure of normal power supply.
5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times so it automatically recharges battery after use.

B. Emergency Voice Communication / Telephone

1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
 - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.
 - b. 120V power shall be provided to power the hands-free device.

2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
 - a. Engraving shall be provided next to the indicator which says "When lit help is on the way".
3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
 - a. The telephone must not shut off if the activating button is pushed more than once.
 - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
 - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
4. The system shall be compatible with ring down equipment and PBX switchboards.
5. The system shall be capable of serving as the audio output for an external voice annunciation system.
 - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
 - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
6. The phone shall be able to:
 - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
 - b. Receive incoming calls from other off-site locations via the public telephone system.
 - c. Acknowledge incoming calls and automatically establishing hands-free two way communications.
 - 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to 6 elevators to be called individually from outside the building over a single telephone line and up to 80 elevators if an On-Site Rescue Station is provided.
7. The emergency elevator communication system shall require a maximum of one telephone line.

- a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
 - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
 8. The system shall provide its own four-hour backup power supply in case of a loss of regular AC power.
 9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
 10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
 - a. If the on-site call is not picked up within 30 seconds, the call will be automatically forwarded to a 24-hour off-site monitoring service.
 - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
 11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
 12. New telephone lines, where required, shall be provided and interfaced by others.
- C. Firefighters' Two-Way Telephone Communications System
1. Provide a complete two-way telephone communications system for point-to-point communications between authorized personnel.
 2. Provide firefighter telephone jack in the car operating panel in accordance with the requirements of the local authorities. The box shall be fitted with a flush mounted door having hairline joints.
 3. Connection devices (jacks) and all associated wiring shall be provided by the elevator Contractor as part of the base bid.
 4. The handsets shall be self-powered and not require an external power source for operation.
- D. Life Safety System
1. Install Life Safety System speaker in each elevator cab.
 2. Provide all necessary wiring and interfacing between the elevator system and the Life Safety System as required.
 3. The Life Safety System speaker shall be furnished under Division 16.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

3.2 INSTALLATION / PROJECT PHASING

A. Installation

1. Install / Modernize the elevators, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1 ¼" at all landings served.
7. Erect guide rails plumb and parallel with a tolerance of 1/8" (plus or minus 1/16")
8. Install rails so joints do not interfere with brackets.
9. Set entrance plumb in hoistway and in alignment with guide rails prior to erection of the front walls.
10. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
11. Reinforce hoistway fascias to allow not more than 1/2" of deflection.
12. Install elevator cab enclosure on platform plumb and align cab entrance with hoistway entrances.
13. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
14. Isolate cab fan from canopy to minimize vibration and noise.
15. Prehang traveling cables for at least 24 hours with ends suitably weighted to eliminate twisting after installation.
16. After installation, touch up in the field, surfaces of shop primed elements which have become scratched or damaged.
17. Lubricate operating parts of system as recommended by the manufacturer.

B. Removal of Elevators

1. If extenuating circumstances (i.e. separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.
4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

C. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

3.3 FIELD QUALITY CONTROL

A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

B. Substantial Completion

1. The work shall be deemed "Substantially Complete" for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.
3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

C. Contractor's Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be

constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Passenger elevators shall be adjusted to meet the following performance requirements:

- a. Speed: within 3% of rated speed under any loading condition.
- b. Leveling: within 1/4" under any loading condition.
- c. Typical Floor-to-Floor Time: (Recorded from the doors start to close on one floor until they are 3/4 open at the next floor.)

Passenger Elevators 9.0-9.5 seconds.

Service Elevators 12.0-12.5 seconds.

- d. Door Operating Times

Door Type	Opening	Closing
42" center opening	1.5-2.0 sec.	2.5-3.0 sec.
48" side opening	2.5-3.0 sec.	4.5-5.0 sec.

- e. Door dwell time for hall calls: 4.0 sec with Advance lantern signals
- f. Door dwell time for hall calls: 5.0 sec without Advance lantern signals
- g. Door dwell time for car calls: 3.0 seconds
- h. Reduced non-interference dwell time: 1.0 seconds.

2. Maintain the following ride quality requirements for the passenger elevators:

- a. For speeds up to 1400 fpm, the speed of the car roller guides shall not exceed 500 rpm.
- b. Where pit permits, extend bottom roller guides by not less than one half the distance from the centerline of the upper roller guides to the platform.
- c. Noise levels inside the car shall not exceed the following:
 - 1) Car at rest with doors closed and fan off - 40 dba.
 - 2) Car at rest with doors closed, fan running - 55 dba.
 - 3) Car running at high speed, fan off - 50 dba.
 - 4) Door in operation - 60 dba.
- d. Vertical acceleration shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.

- 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s^2 (1 milli-g) in the range of $0\text{-}2 \text{ m/s}^2$ over a frequency range from $0\text{-}80 \text{ Hz}$ with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPA (8.7 psi).
- e. Amplitude of acceleration and deceleration shall not exceed 4.0 ft/sec^2 .
- f. A sustained jerk shall not be more than twice the acceleration.
- g. The rate of change in the acceleration/deceleration rate shall not be greater than 8.0 ft/sec^3 .

B. Acceptance Testing

1. Comply with the requirements of Division 01.
2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
 - a. Operation of safety devices.
 - b. Sustained high-speed velocity of the elevator in either direction of travel.
 - c. Brake-to-brake running time and floor-to-floor time between adjacent floors.
 - d. Floor leveling accuracy.
 - e. Door opening/closing and dwell times.
 - f. Ride quality inside the elevator car.
 - g. Communication system.
 - h. Load settings at which anti-nuisance, load dispatch, and load non-stop features are activated.
5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
 - a. Independent service operations
 - b. Restricted access security features and card reader controls
 - c. Zoning operations and floor parking assignments
 - d. Up/down peak operation

7. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION

SECTION 14 91 35

LAUNDRY CHUTES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modifications to existing laundry chute to extend the laundry chute to new floors.
- B. Sustainable design requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Requirements:
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Section 05 50 00 "Metal Fabrications" for metal supporting framework at floor penetrations.
 - 4. Section 07 62 00 "Sheet Metal Flashing and Trim" for roof-vent flashing.
 - 5. Section 07 72 00 "Roof Accessories" for roof curbs.
 - 6. Section 21 13 13 "Wet-Pipe Sprinkler Systems" for fire-suppression water-service connections to automatic sprinklers in the chute.

1.2 DEFINITIONS

- A. Chase: The shaft that encloses a chute.
- B. Intake Door: Door or hatch that penetrates the chase wall and chute, and through which materials are fed into the chute.
- C. Discharge Door: Door or hatch at the bottom of a chute, through which materials exit the chute.
- D. Access Door: Door other than an intake or discharge door that penetrates the chase wall for service access to devices in the chase.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chutes.

- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
 - 1. LEED Product Submittals.
 - 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.

- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include each type and location of intake, discharge, and access door.
 - 4. Include diagrams for power, signal and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plan(s) and other details drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Size and construction of chase enclosing each chute; locations for power, signal, and control wiring; and sprinkler-piping and water-service connections.
- B. Product Certificates: For each type of chute, from manufacturer.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For chutes to include in operation and maintenance manuals.

1.6 COORDINATION

- A. Coordinate with Owner's contractors for Mechanical and Electrical Work Installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Subject to compliance with requirements, provide products by the manufacturer of the existing chutes, or provide comparable products fully compatible and able to integrate into the existing system, by one of the following:
 - 1. American Chute Systems, Inc.
 - 2. Century Chute LLC.
 - 3. Chute Source, LLC.
 - 4. Chutes International.
 - 5. Midland Chutes.
 - 6. U.S. Chutes; U.S.C. Group.
 - 7. Valiant Products, Inc.
 - 8. Western Chutes; a division of Buchanan Company, Inc.
 - 9. Wilkinson Hi-Rise, LLC.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing and inspecting agency, for fire-protection ratings indicated.
 - 1. Test Pressure: Test at atmospheric (neutral) pressure according to NFPA 252 or UL 10B.
 - 2. Intake Doors: Labeled, 1-1/2-hour fire-resistance rated with 30-minute temperature rise of 250 deg F (140 deg C).
 - 3. Discharge Doors: Labeled, 1-1/2-hour fire-resistance rated with 30-minute temperature rise of 250 deg F (140 deg C).
 - 4. Access Doors: Labeled, 1-1/2-hour fire-resistance rated with 30-minute temperature rise of 250 deg F (140 deg C).

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Standard: Provide chutes complying with NFPA 82.

2.3 LAUNDRY CHUTES

- A. Chute Metal: Aluminum-coated, cold-rolled, commercial steel sheet; ASTM A 463/A 463M, Type 1, with not less than T1-40 (T1M-120) coating.
 - 1. Thickness: Manufacturer's standard.
- B. Chute Size: Match diameter of existing chute.
- C. External Reinforcing for Offsets: Additional thickness of 0.11-inch (1.7-mm) thick chute metal with bracing to structure.

2.4 LAUNDRY CHUTE DOORS

- A. Intake-Door Assemblies: ASTM A 240/A 240M, Type 304, stainless-steel self-closing units with positive latch and latch handle, with stainless-steel trim; constructed as required for performance requirements indicated; and with frame suitable for the enclosing chase construction.
 - 1. Door Type: Side hinged 180 degree opening manual door, unless otherwise indicated.
 - 2. Size: Manufacturer's standard size for door type, chute type, and diameter indicated.
 - 3. Finish: Manufacturer's standard satin or No. 3 directional polish.
 - 4. Accessible Door: Manufacturer's standard system complying with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.
- B. Access-Door Assemblies: Manufacturer's standard ASTM A 240/A 240M, Type 302/304, stainless-steel doors with trim; constructed as required for performance requirements indicated; with frame suitable for the enclosing chase construction; and in satin or No. 3 directional polish finish; equipped with cylinder locks that release latch with keys that are removable only when cylinder is locked.
 - 1. Lock Cylinder: Cylinders standard with manufacturer.
 - 2. Keying: Key access-door cylinders alike.
 - 3. Keys: Three for each cylinder.

2.5 ACCESSORIES

- A. Chute Fire Sprinklers: NFPA 13; manufacturer's standard, recessed, automatic, NPS 1/2 (DN 13) sprinklers; ready for piping connections.
- B. Sound Dampening: Manufacturer's standard sound-deadening coating on exterior of chute.

2.6 FABRICATION

- A. General: Factory-assemble chutes to greatest extent practicable with nonleaking, continuously welded or lock-seamed joints without bolts, rivets, or clips projecting into chute interior. Include intake-door assemblies, metal supporting framing at each floor, and chute expansion joints between each support point.
- B. Offsets: Construct offsets where indicated on Drawings. Fabricate so that installed chute is without obstructions that might prevent materials from free falling within chute.
 - 1. Offsets below Intake Doors: Unless otherwise indicated, do not exceed a 15 degree maximum offset angle at any point, or place offset closer than 48 inches to nearest door above offset.
 - 2. Offset above Top Intake Door: Do not exceed a 45 degree maximum offset angle between the highest intake door and the upper termination of chute.
 - 3. Offsets at Floors: Complete offset between floors by returning chute to plumb before penetrating floors.
 - 4. External Reinforcing: Externally reinforce impact area of offsets located below top intake door. Install vibration isolators where braced to structure.
- C. Roof Vent: Fabricate vent unit as full-size extension of chute, open to the atmosphere. Extend vent to height above roofing surface as indicated on Drawings. Equip vent with full insect screening and metal explosion-release cap. Fabricate with roof-deck flange, counterflashing, and clamping ring of nonferrous metal compatible with chute metal.
 - 1. Existing Vent cap may be salvaged and reused, if it's condition is suitable for reuse.
- D. Chute Fire Sprinklers: Install internally within chute, recessed out of the chute area through which material travels, and according to NFPA 13. Locate fire sprinklers at or above the top service opening of chutes, within the chute at alternate floor levels in buildings more than two stories tall, and at the lowest service level.
- E. Equipment Access: Fabricate chutes with access for maintaining equipment located within the chute, such as flushing and sanitizing units, fire sprinklers, and plumbing and electrical connections.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and test chutes before installing enclosing chase construction.
- B. Install chutes to match Owner's existing chute installations.
- C. Install chutes according to NFPA 82 and manufacturer's written instructions. Assemble components with tight, nonleaking joints. Anchor chutes securely to supporting structure to withstand impacts and stresses. Install chute and components to maintain fire-resistive performance of chute and the enclosing chase construction.

- D. Install chutes plumb, without obstructions that might prevent materials from free falling within chutes.
- E. Anchor flanges of chute vents to roof curbs before installing roofing and flashing. Install chute-vent counterflashing after roofing and roof-penetration flashing are installed.
- F. Intake Doors: Interface door units with throat sections of chutes for safe, snag-resistant, sanitary depositing of materials in chutes.
- G. Test and adjust chute components after installation. Operate doors, locks, and interlock systems to demonstrate that hardware operates properly and smoothly and electrical wiring is connected correctly.
- H. Test heat-sensing devices for proper operation.
- I. Plumbing Access Doors: After construction of chase enclosure, verify that access doors have been correctly located and properly installed for their purpose.

3.2 CLEANING

- A. After completing chase enclosure, clean exposed surfaces of chute system's components. Do not remove labels of testing and inspecting agencies.

END OF SECTION

SECTION 14 92 00

PNEUMATIC TUBE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Computer controlled automatic pneumatic tube system, designed and provided by Owner's vendor.
- B. Sustainable design requirements:
 - 1. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED version 4 **Silver** level Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.
- C. Related Sections: Requirements that relate to this section are included but not limited to the sections below.
 - 1. Section 01 81 13 "Sustainable Design Requirements – LEED v4 for Building Design & Construction – New Construction" for sustainable design requirements and detailed sustainable design submittal requirements.
 - 2. Section 01 74 19 "Construction and Demolition Waste Management and Disposal" for disposal of construction, demolition and packaging waste disposal requirements.
 - 3. Division-15 "Mechanical" for requirements.
 - 4. Division-16 "Electrical" for requirements.

1.2 SYSTEM DESCRIPTION

- A. System Designer and manufacturer: Swisslog Translogic.
- B. Design Requirements: Design, engineer, fabricate, and install work in compliance with specified standards, performance requirements, material selections, and requirements of this and related sections.
- C. Listed and Labeling Requirements:
 - 1. Unit to be UL listed

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and

finishes for sending and receiving stations. Include operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. LEED v4 Submittals: Submit available product documentation conforming to requirements listed in Section 01 81 13 "SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 FOR BD+C: HEALTHCARE", for all permanently installed products and materials:
1. LEED Product Submittals.
 2. LEED Credit-Specific Submittals for the following LEED v4 credits:
 - a. Materials and Resources, Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations.
 - b. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. Or:
 - c. Materials and Resources, Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices. If available, for each product submit documentation of the following:
 - 1) Extended Producer Responsibility Program.
 - 2) Bio-Based Materials.
 - 3) Certified Wood Products.
 - 4) Salvaged, Refurbished, or Reused Materials.
 - 5) Recycled Content.
 - d. Materials and Resources, Credit: Building Materials and Resources: Building Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting.
 - e. Materials and Resources, Credit: Building Product Disclosure and Optimization – Material Ingredients. Option 2. Material Ingredients Optimization.
 - f. Indoor Environmental Quality, Credit EQ 2: Low-Emitting Materials. For each product type listed below and applied inside the building weatherproofing barrier.
 - 1) Interior Paints and Coatings applied on site.
 - 2) Interior Adhesives and Sealants applied on site.
 - 3) Flooring Products.
 - 4) Composite Wood Products.
 - 5) Ceilings, Walls, Thermal and Acoustical Insulation products.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show fabrication and installation of the Work, Include the following.
1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 2. Tube routing.
 3. Equipment locations.
 4. Station details.
 5. Wiring Diagrams: For power, signal, and control wiring.
- D. Coordination Drawings: Drawn to scale and coordinating installation of the work of this Section with other construction including but not limited to: Building Structural

and Architectural elements, Mechanical work and equipment, Electrical work and equipment, communications work and equipment and Owner's equipment.

1. Coordination Drawings are required to be provided for this project.
2. All systems and equipment and components are to be fully coordinated for location and interconnection with those system equipment and components provided under other sections of this specification.
3. Refer to Division 01 Section "Project Management and Coordination" for submittal, review and revision requirements.

E. Samples for Initial Selection:

1. Furnish manufacturer's complete color selection showing full range of colors and finish characteristics. Furnish the following.
 - a. Receiving station color selection.

F. Samples for Verification: Furnish materials to be used with labels indicating colors, finish characteristics, and locations of the Work. Samples will be reviewed for color and appearance only. Furnish the following.

1. Sheet or Plate: 6" square in range of finish selected for receiving station.
2. Carriers: Each type of carrier required.

G. Quality Assurance: Submit the following for information:

1. Qualification Data: Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, and other information specified.

H. Product Certificates: For each type of equipment and component, signed by product manufacturer.

I. Operation and Maintenance Data: For tube to include in emergency, operation, and maintenance manuals.

J. Closeout Submittals: Submit the following:

1. Warranty.
2. Maintenance and operating manual.
3. Record documents.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project and has a 5 year record of successful installation experience.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Regulatory Requirements: Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.

C. Single Source Responsibility: Obtain work from a single manufacturer.

- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Preinstallation Conference: Conduct conference at Project site.
 - 1. Inspect and discuss electrical roughing-in, and other preparatory work specified elsewhere.
 - 2. Familiarize installer with conditions at site and related Work.
 - 3. Review tube routing coordination with other work.
 - 4. Review required testing, inspecting, demonstration and certifying procedures.

1.5 DELIVER, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original packaging with label indicating pertinent information identifying the item. Store materials in accordance with manufacturer's instructions in a protected dry location off ground. Do not open packaging nor remove labels until time of installation.

1.6 WARRANTY

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
- B. Special Warranty: Submit written warranty signed by the manufacturer, installer and contractor, agreeing to repair or replace defective materials or workmanship during the following period beginning at the date of substantial completion.
 - 1. Warranty Period: Manufacturer's standard but not less than 2 years.

PART 2 - PRODUCTS

2.1 FABRICATION

- A. General: Design, fabricate and install materials and equipment required to complete the installation of a computer-controlled automatic pneumatic tube system, complete with all required sleeves, inserts, tubing, bends, fittings, carriers, hangers, certain electrical work, testing, adjusting, etc.
 - 1. System to be integrated with and fully compatible with existing system.
- B. System Operation: The System shall be computer controlled. The computer control center shall supervise all system operations by accumulating and storing all system data and displaying this data constantly.
 - 1. Software to be compatible with existing system.
- C. Transmission and Air Line Tubing:
 - 1. General:
 - a. Supply and install all tubing for air and carrier transmission lines. Each standard length shall have one end expanded to form a slip joint.
 - b. Bends shall be of the same material as straight tubing, formed on the centerline to a radius of 50", free from wrinkles or distortions.

- c. All joints shall be sealed with suitable compound to provide an airtight joint. Provide a sufficient number of sleeves in all tubing runs to facilitate removal of stuck carriers.
 - d. No expanded bends shall be allowed in this system.
 - e. Provide hangers and supports on ten foot centers for horizontal runs of tubing. Vertical runs shall be supported at every floor. Each horizontal bend and in-line component shall be supported.
 - f. All new transmission lines, except in mechanical equipment rooms, mechanical shafts and basement non-public service areas shall be insulated with 1" thick, 3/4 lb. density PF-335 flexible fiberglass with 0.0025 foil facing with joints taped.
 - g. Tubing Size: To accommodate carriers.
2. Existing Systems: Tubing to be of the same size as existing system. Unit to be compatible with existing system.
- D. Exhausters:
1. Provide an exhauster for each zone and the central storage area.
 2. Exhausters shall be supplied in factory assembled modules complete with vibration isolators, intake and exhaust mufflers, intake and exhaust piping, screen box, air valves, and insulation. Side panel shall be readily removable for access.
 3. Each exhauster shall be connected by flexible sleeves to appropriate connections.
- E. Sending and Receiving Stations:
1. Wall recessed units. Provide where indicated on drawing.
 2. The stations operating panel shall consist of a matrix panel with station names for easy selection, a send button and a station on/off button. If a selected station is inoperative the words "Off-Line" shall appear on the panel. If the selected station is not able to receive a carrier the words "Not Available" shall appear on the operating panel.
 3. All wall type stations shall have the concealed portion sound deadened using manufacturer's standard deadening material.
- F. Carriers:
1. General:
 - a. Units to be molded plastic, side opening, self-latching upon closure, leak resistant, replaceable wear bands and bi-directional. 1) Liquid / Vapor Detectors: Provide Owner designated units with manufacturer's liquid /vapor activated alarm buzzer and LED warning lights.
 - b. Color of units to be selected by determined by Owner for designated transport capabilities.
 - c. Provide 4 units per station.
 2. Furnish foam lined carriers designed to handle the following:
 - a. Containers of blood.
 - b. Containers of specimens.
 - c. Various drug items from the pharmacy.
 3. Carrier Size:
 - a. Carriers shall be large enough to handle the following:
 - 1) 1000 ML-IV plastic bag, 516 ML whole blood bag.
 - 2) 100 EDP card, X-Ray file.
 - 3) Normal correspondence.

4. Existing System: Furnish side opening carriers having a clear inside length to match existing carriers.
- G. Miscellaneous:
1. An Air Compressor and dryer shall be supplied with system to supply air to station dispatching chamber and in-line transfer units.
 2. Auxiliary Power Supply: Provide and wire inside of each transfer unit and exhauster package a two plug, 115 volt receptacle which will be used to provide light and service power tools during preventative maintenance work.
 3. Phone Jacks: Provide and wire into each main component a phone jack which will allow voice communication between maintenance at various components and the main control center.
 4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Examine and correct conditions of area to receive the Work prior to installation. Comply with the following requirements.

3.2 PREPARATION

- A. Coordinate and Furnish: Anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of items having integral anchors embedded in construction. Coordinate delivery of such items to the project site.

3.3 INSTALLATION

- A. General: Install system in accordance with manufacturer's printed installation instructions, submittals, applicable industry standards, and governing regulatory requirements for the Work.

3.4 FIELD QUALITY CONTROL

- A. Site Test: Installer to conduct operational testing of complete system in the presents of the Owner. Work not meeting specified requirements and other units having similar deficiencies shall be corrected at no cost to the Owner.

3.5 ADJUSTING AND CLEANING

- A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.
- B. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

3.6 DEMONSTRATION

- A. Factory trained manufacturer representative shall provide demonstrations to Owner's staff.

3.7 PROTECTION

- A. Protect the Work so it will not deteriorate or be damaged. Remove protection at time of Substantial Completion.

END OF SECTION

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