GREATER PORTLAND HEALTH

CARING FOR THE WHOLE COMMUNITY

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Approved with Conditions
Date: 11/03/17

63 Preble Street Clinic Renovations

PROJECT MANUAL

Divisions 0 - 26

e4h ENVIRONMENTS FOR HEALTH ARCHITECTURE

ISSUED FOR: CONSTRUCTION

GREATER PORTLAND HEALTH - 63 PREBLE STREET

Portland, Maine

E4H Project No. 2017008

Date: July 26, 2017

183 Middle Street, 3rd Floor | Portland, Maine | 207.773.8841

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SECTION 000102

PROJECT INFORMATION

PART 1 - GENERAL

1.1 PROJECT IDENTIFICATION

Project Name: 63 Preble Street Renovation

Project Number: 2017008

The Owner, hereinafter referred to as Owner:

Greater Portland Health
180 Park Avenue
Portland, Maine 04101
Contact: Ms. Ann Tucker, Chief Financial Officer

1.2 PROJECT DESCRIPTION

A. **Summary Project Description**: The project consists of approximately 1,315 SF of interior renovations to modify existing space. Work will include interior fit-up, finishes. The project will also include improvements to the building infrastructure (mechanical, electrical, and plumbing) systems.

1.3 DIRECTORY

A. **Architect:**
E4H Environments for Health Architecture
183 Middle Street, 3rd Floor
Portland, ME 04101
Contact: Brian Laderbush, Project Manager
Telephone: (207) 773-8841
bladerbush@e4harchitecture.com
(207) 773-8841

B. **Electrical Engineering Consultant:**
Swiftcurrent Engineering Services, Inc.
10 Forest Falls Drive, Unit 4B
Yarmouth, ME 04096
Contact: Timothy Matthews, PE, President
tim@swiftcurrenteng.com
(207) 847-9280

C. **Mechanical / Plumbing / Fire Protection / HVAC Consultant:**
Mechanical Systems Engineers
10 Forest Falls Drive, Unit 10B
Yarmouth, ME 04096
Contact: Kurt Magnusson, P.E.
kurt@mechanicalsystemseng.com
(207) 846-1141

D. **Construction Manager:**
H.E. CALLAHAN
2664 Turner Road
PO Box 677
Auburn, ME 04212-0677
Contact: Jeffrey W. Ohler
johler@hecallahan.com
(207) 784-6927

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

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SECTION 011000

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Definitions.
2. Work Covered by Contract Documents.
3. Existing Conditions and Measurements.
4. Contractor Use of Site and Premises.
5. Work Sequence
6. Division 1 Specification Sections Applicable to All Contracts.
7. Drawing Conventions.
8. Project Manual Formats and Conventions.

1.2 DEFINITIONS

A. **Approved:** The term approved, when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

B. **Directed:** Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Architect, requested by the Architect, and similar phrases.

C. **Furnish:** The term furnish means supply and deliver to the Project site, unloaded, unpacked, inspected for damage, and ready for assembly, installation, and similar operations.

D. **Indicated:** The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.

E. **Install:** The term install describes operations at the Project site including the actual assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

F. **Installer:** An Installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform, having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

G. **Products:** Consists of new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work. Products may also include existing materials or components required for reuse.

H. **Project site:** The space available to the Contractor for performing construction activities either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is as defined by the Owner and Project Coordinator.

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I. **Provide:** The term provide means to furnish and install, complete and ready for the intended use.

J. **Testing Agencies**: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on, and if required, to interpret results of those inspections or tests.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Refer to Section 000102 - PROJECT INFORMATION for project description.

B. The Work of Project is defined by the Contract Documents.

C. Type of Contract: Project will be constructed under a single prime contract.

1.4 EXISTING CONDITIONS & MEASUREMENTS

A. Information pertaining to the project site has been obtained through casual field observations and existing record documents and is indicated on the Drawings and in the Project Manual. This information has been gathered with reasonable care but is of a schematic nature and is not warranted. Verify all dimensions in the field prior to ordering materials or construction.

B. Be alert to any indication or evidence of existing building conditions not indicated in the Contract Documents. Measurements shall be verified from actual observation at the project site. If unexpected existing conditions are encountered, cease operations immediately and notify the Architect.

C. Cost of unavoidable initial damage and such supplemental and remedial work that is ordered by the Architect shall be borne by the Owner in accord with the General Conditions.

D. The Contractor shall bear the cost of damage resulting from his failure to exercise reasonable care in his work or from continuing operations without notifying the Architect.

1.5 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas as defined by Owner's Representative.

B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others.
   3. Work by Owner.
   4. Use of adjacent portions of the site and premises by the public.

C. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Use of the Existing Building:
   1. Maintain the existing building in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.
   2. Existing building spaces (outside of the construction limits) may not be used for storage.

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E. Time Restrictions:

1. Limit conduct of especially noisy, malodorous, and dusty exterior and interior work to the hours of 8:00 a.m. to 5:00 p.m.
2. Sensitive medical operations are located directly adjoining the project site. Contractors may be required to stop or limit work at certain times based on Owner operations.
   a. Limit conduct of especially noisy interior work to the times of day acceptable to the Owner.
   b. Contact Owner's Representative prior to beginning especially noisy work.
3. Contractors shall perform certain work at times as necessary to minimize disruptions of the Owner's facility, including evenings, nights and weekends.
   a. For additional work required to keep disruptions of the Owner's existing facility to a minimum as requested by the Owner.
4. Perform additional work required to meet established Contract time limits after regular working hours (7:00 AM to 5:00 PM) or, after notification of the Owner, on Sundays or on legal holidays as necessary. Deviations from this restriction require approval in writing from the Owner.

F. Utility Outages and Shutdown:

1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days of notice to Owner and authorities having jurisdiction.
2. Limit shutdown of utility services to 4 hours at a time, arranged at least 96 hours in advance with Owner.
3. Prevent accidental disruption of utility services to other portions of the facility.

G. Smoking Policy:

1. All construction personnel and employees of the Contractor shall strictly observe the Owner's smoking policy. Smoking shall be prohibited on Hospital property by all personnel.

1.6 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner's Representative.

1.7 DIVISION 1 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.

B. Section 012000 - PRICE AND PAYMENT PROCEDURES.

C. Section 013000 - ADMINISTRATIVE REQUIREMENTS.

D. Section 013400 - CONTRACTOR REQUESTS FOR INFORMATION.

E. Section 013400.1 - REQUEST FOR INTERPRETATION (RFI) FORM.

F. Section 014000 - QUALITY REQUIREMENTS.

G. Section 014100 - REGULATORY REQUIREMENTS.

H. Section 014200 - REFERENCES.

I. Section 015000 - TEMPORARY FACILITIES AND CONTROLS.

J. Section 015100 - TEMPORARY UTILITIES.

K. Section 016000 - PRODUCT REQUIREMENTS.

L. Section 016200 - PRODUCT SUBSTITUTIONS.

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M. Section 016200.1 - SUBSTITUTION REQUEST FORM.

N. Section 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS.

O. Section 017329 - CUTTING AND PATCHING.

P. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

Q. Section 017800 - CLOSEOUT SUBMITTALS.

1.8 DRAWING CONVENTIONS

A. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations as scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.9 PROJECT MANUAL FORMATS AND CONVENTIONS

A. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

B. Project Manual Format: The Project Manual is organized into Divisions and subdivided into Sections and Documents using Construction Specification Institute (CSI) publication "MasterFormat, 2004 Edition" numbering system.

1. Section Identification: Six/Eight digit Section numbers are utilized and cross-referenced throughout the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because only those Section numbers which are applicable to this Project are used.
2. Division One of the Project Manual governs procedural and administrative requirements of the Work. Division One requirements are applicable to all Sections and Documents in the Project Manual.

C. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular as applicable to the context of the Contract Documents.
2. Imperative mood and streamlined language is generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
3. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

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SECTION 012000

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Price and Contract Time.

C. Change procedures.

D. Correlation of Construction Manager submittals based on changes.

E. Procedures for preparation and submittal of application for final payment.

1.2 SCHEDULE OF VALUES

A. Form to be used: AIA Form G703 - Application and Certificate for Payment Continuation Sheet.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to the Owner and the Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Construction Manager Agreement.

E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify bonds and insurance.

F. Revise schedule to list approved Change Orders, with each Application for Payment.

1. Change orders shall be rolled into the originally approved schedule of value line items, and shall not be tracked separately from the original schedule.

2. The Subcontractor schedules of value shall include break-out by CM's change order numbers.

1.3 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Form to be used: AIA Document G702 - Application and Certificate for Payment and AIA Document G703 - Continuation Sheet.

C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to the Owner and the Architect for approval.

D. Forms filled out by hand will not be accepted.

E. For each item, provide a column for listing each of the following:

1. Item Number.

2. Description of work.

3. Scheduled Values.

4. Previous Applications.

5. Work in Place and Stored Materials under this Application.

6. Total Completed and Stored to Date of Application.

7. Percentage of Completion.

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8. Balance to Finish.

9. Retainage.

F. Execute certification by signature of authorized officer.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

H. Submit three copies of each Application for Payment, as well as complete electronic version.

I. Include the following with the application:

1. Waivers of Mechanics Lien: With each Application for Payment submit waivers of mechanics liens from sub-construction Managers or sub- sub-construction Managers and suppliers for the construction period covered by the previous application.

a. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.

b. When an application shows completion of an item, submit final or full waivers.

c. The Owner reserves the right to designate which entities involved in the Work must submit waivers.

d. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.

J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.4 INITIAL APPLICATION FOR PAYMENT

A. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:

1. List of sub-construction Managers.

2. List of principal suppliers and fabricators.

3. Schedule of Values.

4. Construction Manager's Construction Schedule (preliminary, if not final).

5. Schedule of principal products.

6. Schedule of unit prices.

7. List of Construction Manager's staff assignments.

8. Certificates of insurance and insurance policies.

1.5 MODIFICATION PROCEDURES

A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Construction Manager's employ or Sub-construction Managers of changes to the Contract Documents.

B. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710.

C. For other required changes, Architect will issue a document signed by Owner instructing Construction Manager to proceed with the change, for subsequent inclusion in a Change Order.

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1. The document will describe the required changes and will designate method of determining any change in Contract Price or Contract Time.

2. Promptly execute the change.

D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Construction Manager shall prepare and submit a fixed price quotation within 10 days.

1. Such request is for information only, and is not an instruction to execute the changes, or to stop work in progress.

E. Construction Manager may propose a change by submitting a request for change to the Owner, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other Construction Managers. Document any requested substitutions in accordance with Section 016000 - PRODUCT REQUIREMENTS or Section 016200 - PRODUCT SUBSTITUTIONS.

F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Construction Manager's price quotation.

a. Detailed pricing shall be provided in a format acceptable by the Owner.

2. For change requested by Construction Manager, the amount will be based on the Construction Manager's request for a Change Order as approved by the Owner and Architect.

3. For pre-determined unit prices and quantities, amount will be based on fixed unit prices.

4. For change or directive ordered by Architect without a quotation from Construction Manager, the amount will be determined by Architect based on the Construction Manager's substantiation of costs as specified for Time and Material work.

a. The Architect can initiate a directive only after the approval from the Owner.

G. Substantiation of Costs: Provide full information required for evaluation.

1. Provide following data:

a. Quantities of products, labor, and equipment.

b. Taxes, insurance, and bonds.

c. Overhead and profit.

d. Justification for any change in Contract Time.

e. Credit for deletions from Contract, similarly documented.

2. Support each claim for additional costs with additional information:

a. Origin and date of claim.

b. Dates and times work was performed, and by whom.

c. Time records and wage rates paid.

d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

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3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

H. Execution of Change Orders: Change Orders will be issued by the Construction Manager for Owner and Architect signatures.

I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.

1. Change orders shall be rolled into the originally approved schedule of value line items, and shall not be tracked separately from the original schedule.

2. The Subcontractor schedules of value shall include break-out by CM's change order numbers.

J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

K. Promptly enter changes in Project Record Documents.

1.6 APPLICATION FOR PAYMENT AT SUBSTANTIAL COMPLETION

A. Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. Administrative actions and submittals that shall proceed or coincide with this application include:

1. Occupancy permits and similar approvals.

2. Changeover information related to Owner's occupancy, use, operation and maintenance.

3. Application for reduction of retainage, and consent of surety.

4. Advice on shifting insurance coverages.

5. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

1.7 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Price, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS.

2. All closeout submittals specified in Section 017800 - CLOSEOUT SUBMITTALS have been received and approved.

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PART 3 - EXECUTION (NOT USED)

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SECTION 013000

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Preconstruction meeting.

B. Progress meetings.

C. Pre-Installation conference.

D. Construction progress schedule.

E. Progress photographs.

F. Coordination drawings.

G. Submittals for review, information, and project closeout.

H. Number of copies of submittals.

I. Submittal procedures and requirements.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS: Additional coordination requirements.

D. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

E. Section 017800 - CLOSEOUT SUBMITTALS: Project record documents.

1.3 PROJECT COORDINATION

A. Cooperate with the Owner's Representative in allocation of mobilization areas of site; for field offices and sheds, for material access, traffic, and parking facilities.

B. During construction, coordinate use of site and facilities through the Owner's Representative.

C. Comply with Construction Manager's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

D. Comply with instructions of the Construction Manager and Owner's Representative for use of temporary utilities and construction facilities.

E. Coordinate field engineering and layout work under instructions of the Construction Manager.

F. Make the following types of submittals to Architect through the Construction Manager:

1. Requests for interpretation.
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.

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6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Closeout submittals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRECONSTRUCTION MEETING

A. Construction Manager shall schedule a meeting after the Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect/Engineer.
   3. Construction Manager
   4. Subcontractors and major suppliers.
      a. Representatives of Subcontractors and suppliers attending meeting shall be qualified and authorized to act on behalf of the entity each represents.
   5. Others as appropriate.

C. Agenda:
   1. Submission of executed insurance certificates.
   2. Distribution of Contract Documents.
   3. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule and emergency contact list of all Contractors and Sub Contractors.
   4. Designation of personnel representing the parties to Contract, Owner, and Architect.
   5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures.
   6. Scheduling:
      a. Tentative construction schedule.
      b. Critical work sequencing.
      c. Equipment deliveries and priorities.
   7. Use of premises:
      a. Working hours.
      b. Work, office, and storage areas.
      c. Construction facilities, controls, and construction aids.
      d. Temporary utilities.
      e. Security procedures.
   8. Safety and first-aid procedures.
   9. Housekeeping procedures.
   10. Procedures for maintaining Record Documents.

D. Construction Manager to record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

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3.2 PROGRESS MEETINGS

A. Construction Manager to schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals.

B. Construction Manager to make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

1. Representatives of Subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
2. The Architect and the Owner's Representative may attend meetings to ascertain that Work is expedited consistent with Contract Documents and construction schedules.

D. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Planned progress during succeeding work period.
9. Coordination of projected progress.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to Work.

E. Construction Manager shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.3 PRE-INSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the site a minimum of 10 working days before each construction activity begins. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect/Engineer of scheduled meeting dates.

3.4 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.

1. Include written certification that major contractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

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3.5 PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.

B. Photography Type: Digital; electronic files.

C. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Architect.

D. In addition to periodic, recurring views, take photographs of each of the following events:
   1. Completion of site clearing.
   2. Excavations in progress.
   3. Foundations in progress and upon completion.
   4. Structural framing in progress and upon completion.
   5. Enclosure of building, upon completion.
   6. Final completion, minimum of ten (10) photos.

E. Take photographs as evidence of existing project conditions.

3.6 COORDINATION DRAWINGS

A. Provide information required by Construction Manager for preparation of coordination drawings.

B. Review drawings prior to submission to Architect.

3.7 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with "Submittal Procedures" article below and for record documents purposes described in Section 017800 - Closeout Submittals.

3.8 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator for Owner. No action will be taken.

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3.9 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit the following for all aspects of the project:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

B. Submit for Owner's benefit during and after project completion.

3.10 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review or for Information: All documents are requested to be submitted electronically.
   1. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
   2. When necessary to submit printed copies, submit the following:
      a. Small Size Sheets, Not Larger than 8-1/2 x 11 inches (215 x 280 mm): Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.
      b. Larger Sheets, Not Larger than 36 x 48 inches (910 x 1220 mm): Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra copy of submittals for information.

3.11 SUBMITTAL PROCEDURES

A. Transmit each submittal with AIA Form G810.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Deliver submittals to Construction Manager at business address.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Architect review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

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K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

M. Provide space for Construction Manager, Architect and engineering consultant review stamps, on the front page of each item's submittal copy. Apply Construction Manager's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and the Contract Documents. The Architect's stamp shall contain the following data (Engineering consultant review stamps may vary in language, but intent of language is similar):

_____ REVIEWED

_____ FURNISH AS CORRECTED

_____ REVISE AND RESUBMIT

_____ SUBMIT SPECIFIED ITEM

_____ REJECTED

1. The Architect will insert the date of action taken and an identification of the person taking the action.
2. Submittal grading:
   a. REVIEWED - No corrections, no marks.
   b. FURNISH AS CORRECTED - Minor corrections required are as noted; all items can be fabricated as noted, without further correction and resubmission of original submission; checking is complete and all corrections are deemed obvious without ambiguity.
   c. REVISE AND RESUBMIT - Resubmission is required; checking may be incomplete; details of items noted by checker are to be clarified further before full review can be given. Correct and resubmit, do not fabricate noted items requiring correction.
   d. REJECTED - Submittal is rejected as not in accord with the Contract Documents, too many corrections, or other justifiable reasons. When returning submission, Architect will state reasons for rejection. Correct and resubmit, do not fabricate.
3. Review/approval neither extends nor alters any contractual obligations of the Architect, Engineer or Construction Manager.

N. Identify all variations from Contract Documents, and product or system limitations which may be detrimental to successful performance of the completed work.

O. Construction Manager's review: Review all shop drawings, product data and samples. Include, without limitation, verification of the following:
1. Proper title, original date, drawing number (which shall be changed if resubmitted), revision numbers and dates, designation of project Construction Manager, contractor and/or supplier.
2. Identification of Shop Drawings, Product Data or Samples by Specification Section and subsection or paragraph where appropriate and identification of Contract Drawings by number and detail.
3. On each submittal, as a minimum, Construction Manager shall identify the following:
   a. Errors, inconsistencies, and omissions discovered in the contract documents and field conditions must be reported at once to the Architect.
   b. Any variations from code requirements contained in the contract documents must be reported promptly in writing to both the Architect and Owner.

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c. Promptly report to the Architect information that any design, process, or product infringes on a patent.

d. Names of contractor(s) and supplier(s). Include name(s) of contact person(s), address, telephone and fax number(s).

P. Revise and resubmit submittals as required, identify all changes made since previous submittal. Distribute copies of reviewed submittals to concerned parties; instruct parties to promptly report any inability to comply with provisions.

3.12 SUBMISSION REQUIREMENTS

A. General: The Architect has adopted the use of NEWFORMA™ for the exchange and storage of files related to this Project. All submissions (except physical samples) shall be processed through the NEWFORMA™ system.

B. Furnish Architect with electronic files through the Adobe Acrobat Portable Document Format (PDF) files for each of the following submittal types:

1. Schedules
2. Shop drawings.
3. Product data, manufacturer's instructions and certificates and similar submissions.
4. Emergency addresses: 1 file to Architect, and 1 file direct to Owner.

C. Furnish Architect with the following quantities of the following physical submittals:

1. Samples: Sets of 3 identical samples of each submission required.

D. General submission of physical submittals; deliver to Architect at the following address:

E4H Environments for Health Architecture
183 Middle Street, 3rd Floor
Portland, ME 04101

E. Transmit submittals to Architect at the above address.

1. Identify Project, Construction Manager, contractor, installer, or supplier, pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate. Transmittals received by the Architect from sources other than the Construction Manager will be returned without any action taken.
2. Construction Manager shall number submittals sequentially by Specifications Section prior to submittal. Resubmitted items shall retain number and be noted as resubmitted (example 260000-1 R1).

END OF SECTION

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SECTION 013400

CONSTRUCTION MANAGER REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

A. Administrative requirements for requests for information.

1.2 DEFINITIONS

A. Requests for Information:

1. A document (RFI) submitted by the Construction Manager requesting clarification of a portion of the Contract Documents.
2. A properly prepared request for information shall include a detailed written statement that indicates the specific drawing or specification in need of clarification and the nature of the clarification requested.
   a. Drawings shall be identified by drawing number and location on the drawing sheet.
   b. Specifications shall be identified by Section number, page and paragraph.

B. Improper RFI:

1. An RFI that is not properly prepared.
2. An improper RFI will be processed by the Architect at the Architect's standard hourly rate and the Architect will charge the Owner; such costs will be deducted from monies still due the Construction Manager. The Construction Manager will be notified by the Architect prior to the processing of an improper RFI.

C. Frivolous RFI:

1. An RFI that requests information that is clearly indicated in the Contract Documents.
2. A frivolous RFI may be returned unanswered or may be processed by the Architect at the Architect's standard hourly rate and the Architect will charge the Owner; such costs will be deducted from monies still due the Construction Manager. The Construction Manager will be notified by the Architect prior to the processing of a frivolous RFI.

1.3 CONSTRUCTION MANAGER'S REQUESTS FOR INFORMATION

A. When the Construction Manager is unable to determine from the Contract Documents, the material, process or system to be installed, the Architect will be requested to make a clarification of the indeterminate item.

1. Whenever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, the Construction Manager shall prepare and submit an RFI to the Architect.

B. The Construction Manager shall endeavor to keep the RFI quantity to a minimum. In the event the process becomes unwieldy, in the opinion of the Architect, because of the quantity and frequency of requests, the Architect may require the Construction Manager to abandon the process and submit future requests as either submittals, substitutions, or requests for change.

C. An RFI shall be submitted on a form acceptable to the Architect. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after photocopying or transmission by facsimile (fax). Each page of attachments shall bear the RFI number in the lower right corner.

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D. An RFI shall be originated through the Construction Manager.
   1. An RFI from a subcontractor or material supplier shall be submitted to, reviewed by and signed by the Construction Manager prior to submittal to the Architect.
   2. An RFI sent directly to the Architect or the Architect's consultants, by a subcontractor, will not be accepted and will be returned unanswered.

E. The Construction Manager shall carefully study the Contract Documents to assure that the requested information is not available there. An RFI that requests information available in the Contract Documents will be deemed "improper" or "frivolous".

F. In cases where an RFI is issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically and similar items, the Construction Manager shall offer assistance or suggest solutions using drawings or sketches drawn to scale, and submitted with the RFI. An RFI which fails to include a suggested solution will be returned unanswered with a requirement that the Construction Manager submit a complete request.

G. An RFI shall not be used for the following purposes:
   1. To request approval of submittals.
   2. To request approval of substitutions.
   3. To request changes that entail additional cost or credit.
   4. To request different methods of performing work than those drawn or specified.

H. In the event the Construction Manager believes that a clarification by the Architect results in additional cost or time, the Construction Manager shall not proceed with the work indicated by the RFI until a change order is prepared and approved. An RFI shall not automatically justify a cost increase in the work or a change in the project schedule.
   1. An answered RFI shall not be construed as approval to perform extra work.

I. The Construction Manager will prepare and maintain an RFI log, and furnish copies of the log to all parties indicating the status of all RFIs.

J. The Construction Manager shall allow up to 14 days for review. However, the Architect and the consultants will endeavor to respond in a timely fashion to an RFI.

1.4 ARCHITECT'S RESPONSE TO REQUESTS FOR INFORMATION

A. The Architect will respond to an RFI on one of the following forms:
   1. Properly prepared RFI:
      a. Architect's Supplemental Instructions.
      b. Section 013400.1 - REQUEST FOR INTERPRETATION (RFI) FORM.
      c. Work Changes Proposal Request.

B. Improper or frivolous RFI:
   1. Notification of processing fee.
   2. An unanswered RFI will be returned with a stamp or notation: Not Reviewed.

C. The Architect may opt to retain an RFI for discussion during regularly scheduled project meetings, for inclusion of responses in meeting minutes in lieu of responding on a written form.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION – (NOT USED)

END OF SECTION

Greater Portland Health
63 Preble Street
Portland, ME 04101

E4H Environments for Health Architect
Project No. 2017(
July 26, 2(

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SECTION 013400.1

REQUEST FOR INTERPRETATION (RFI) FORM

Date Submitted: _____

To the Architect: E4H Environments for Health Architecture
183 Middle Street, 3rd Floor
Portland, ME 04101
Contact: Brian Laderbush, Project Manager
bladerbush@e4harchitecture.com
(207) 773-8841

Architect's Assigned RFI #
_____

A/E Project Number: 2017008

Submitted By: Company: _____

Address _____

References: Specification Section Number: _____

Article/ Paragraph / Subparagraph: _____

Drawing Number: _____

Detail Number: _____

Request: _____

☐ Refer to Attachment(s) _____

Signed By: _____

Greater Portland Health
63 Preble Street
Portland, ME 04101

E4H Environments for Health Architect
Project No. 20170
July 26, 20

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Response: _____

☐ Refer to Attachment(s)

Response From: _____

Signed by: _____

Copies to: ☐ Owner ☐ Consultants ☐ _____
☐ _____ ☐ _____ ☐ _____
☐ _____ ☐ _____ ☐ File

Date Received at Architect
_____

Date Returned by Architect
_____

END OF SECTION

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SECTION 014000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. General quality assurance and control of installation.

B. Site safety, worker safety and training.

C. Contractor's quality control (QC) program.

D. Source quality control.

E. Field samples and mock-ups.

F. Manufacturer's field services and reports.

G. Field quality control, Owner's right for confirmation.

1.2 GENERAL QUALITY ASSURANCE AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including performance of each step in sequence. Notify Architect when manufacturers' instructions conflict with the provisions and requirements of the Contract Documents; obtain clarification before proceeding with the work affected by the conflict.

C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate high standards or more precise workmanship.

D. Perform work by persons qualified to produce workmanship of specified quality.

E. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.3 SITE SAFETY, WORKER SAFETY AND TRAINING

A. General: The Construction Manager (and his subcontractors) shall, at all times, exercise reasonable precautions for the safety of all persons. All rules, regulations, and laws concerning safety that are in effect at the work site, and in particular, all applicable regulations of the Occupational Safety and Health Administration (OSHA) of the U.S. Government, in addition to specified requirements shall be complied with in all respects.

1. Construction Manager's responsibility for safety shall apply continuously twenty four (24) hours per Day during the term of this Contract and is not limited to normal working hours.

B. Construction Manager's Safety Program: Prior to commencement of the Work, the Contractor shall develop and implement a Safety and Health Plan to comply with the Occupational Safety and Health Administration (OSHA) standards for the Construction Industry and all other applicable Federal, State, local laws and regulations. Construction Manager's Safety and Health Plan, and included health and safety procedures and policies, shall be submitted to the Architect and Owner's Representative within fifteen (15) Days after the date of Notice to Proceed and in no event later than commencement of the Work, whichever occurs first.

1. Perform pre planning to ensure access Is provided to Fire Department for all areas of the work site throughout the duration of the Contract. The Construction Manager's shall provide the Fire Department site access maps, updated regularly, to reflect

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changes in the layout of the work site and shall notify the Fire Department when eac update is made

2. Post and maintain, at prominent locations throughout the Project site, emergency telephone numbers and shall insure that all personnel on site are continuously aware of this information.
3. Ensure safe access to the Work for the Owner, Architect, Architect's consultants, their designated representatives, and all others charged with inspection, testing and monitoring of the Work, and visitors to the site. The Construction Manager's shall furnish site visitors with safety equipment, test equipment, safety apparel and instructions that are required to insure their safety on site, and In the performance of their duties related to the Work of this Contract

C. To the extent mandated by code or other regulation, and in compliance with labor agreements, employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration. The OSHA training and certification course shall occur at the time each employee begins work. To the extent required, furnish documentation to Owner and Architect, for each employee requiring training documenting successful completion of the OHSA safety training and certification course.

1.4 CONTRACTOR'S QUALITY CONTROL PROGRAM

A. Procedures: Construction Manager, contractors and each subcontractor shall include all labor, materials, equipment, services and incidental items necessary to implement quality control procedures to the extent necessary to demonstrate and maintain compliance with the Contract Documents.

B. It is recognized that the Construction Manager maintains standing written procedures as a corporation for the assurance of quality in finished projects. The Architect and Owner shall review and approve such corporate QA/QC program; review will be against the guidance provided by the following paragraphs and approval may be conditioned with requirements to expand specific sections to meet specific requirements of the Owner and/or the Owner's funders.

C. Quality Control Plan: Within 20 days after Notice to Proceed, the Construction Manager shall submit a Quality Control (QC) Plan to the Owner's Representative and Architect for approval. The plan shall address the following, as a minimum:

1. The Construction Manager's commitment to quality and implementing and managing the QC program.
2. Identification of the Construction Manager's onsite QC Manager, with name, qualifications, duties and responsibilities. The QC Manager shall have the authority to direct the removal and replacement of non-conforming work. The QC Manager shall be present for all QC meetings, inspections and tests during the project.
3. Procedures for addressing and commenting QC with Construction Manager's staff, all subcontractors and suppliers, and Owner, Architect and Owner's representative.
4. Procedures for review of submittals and submittal status, and documentation of same.
5. Procedures for pre-installation meetings and documentation of same.
6. Procedures for inspections of deliveries and documentation of same.
7. Procedures for benchmark inspections, defined as initial installations, and documentation of same.
8. Procedures for mockup inspections and documentation of same.
9. Procedures for equipment in place, inspections and documentation of same.

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10. Procedures for inspections prior to closures of concealment and documentation of same.
11. Procedures for start-up and commissioning and documentation of same.
12. Procedures for turnover and documentation of same.
13. Procedures for identifying, recording, tracking correcting and reporting items requiring rework, using a Rolling Completion list chronological item number, phase area, date listed, description, party responsible for correction, date notified, and date corrected.
14. Procedures for testing and documentation of same.
15. Procedures for corrective action on Architect's Field Reports and Testing Agency reports and documentation of same.

D. Procedures for reporting on all of the above on a monthly basis as a condition precedent to review of the Construction Manager's application for payment.

1.5 SOURCE QUALITY CONTROL

A. 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.

B. Fabricator Qualifications: A firm experienced in producing products 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. Product Labeling: Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code(s).

1. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
   a. Model number.
   b. Serial number.
   c. Performance characteristics.

1.6 FIELD SAMPLES

A. Install field samples demonstrating quality level for the Work, at the site as required by individual specifications Sections for review and acceptance by Architect. Remove field samples prior to date of Final Inspection, or as directed.

1.7 MOCK-UPS

A. Where requested by Architect, or as specified in individual specification sections, assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes. Remove mock-up assemblies prior to date of Final Inspection, or as directed.

B. Mock-ups, when approved by the Architect/Engineer, will be used as datum for comparison with the remainder of the Work for the purposes of acceptance or rejection.

C. Demolish and remove from site prior to requesting inspection for certification of Substantial Completion, all Mock-ups which are not permitted to remain as part of the finished work.

1.8 MANUFACTURER'S FIELD SERVICES AND REPORTS

A. When called for by individual Specification Sections, provide at no additional cost to the Owner, manufacturers' or product suppliers' qualified staff personnel, to observe site conditions, start-up of equipment, adjusting and balancing of equipment, conditions of surfaces and installation, quality of workmanship, and as specified under the various Sections.

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1. Individuals shall report all observations, site decisions, and instructions given to applicators or installers. Immediately notify Architect of any circumstances which are supplemental, or contrary to, manufacturer's written instructions.
2. Submit full report within 30 calendar days from observed site conditions to Architect for review.

1.9 FIELD QUALITY CONTROL

A. The Owner reserves the right to take samples and perform, at random, tests of approved materials delivered to the job site to verify compliance of actual materials with specifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 014100

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section consists of:

1. Applicable codes and regulations.

1.2 DEFINITIONS

A. Regulations include laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, and rules, conventions and agreements within the construction industry that control performance of the Work, whether lawfully imposed by authorities having jurisdiction or not.

1.3 APPLICABLE CODES AND REGULATIONS

A. All work shall be performed in accordance with the latest version, by DATE OF ISSUE for Contract Documents, current on date of Owner-Construction Manager Agreement, except as indicated otherwise, of all applicable codes including the following:

1. Maine Uniform Building and Energy Code.
2. 2009 International Building Code.
3. 2009 International Energy Conservation Code.
4. 2009 International Mechanical Code.
5. National Fire Protection Association: NFPA 99 – Standard for Health Care Facilities, 2012 Edition.
6. National Fire Protection Association: NFPA 101 - Life Safety Code, 2012 Edition.
7. National Fire Protection Association: NFPA 241 - Standard for Safeguarding Building Construction and Demolition Operations, 2009 Edition.
8. United States Occupational Safety and Health Administration (OSHA): Standard Nº. 29-CFR-1926.59 - Hazard Communication Standard.
9. 2010 Americans with Disabilities Act – accessibility guidelines
10. Publication Dates: Where the date of issue of a code or regulation is not specified, comply with the standard in effect as of date of Contract Documents, or as

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 014200

REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Abbreviations and Acronyms.

B. Definitions.

C. Reference Standards.

1.2 ABBREVIATIONS AND ACRONYMS

A. The following lists of common abbreviations are referenced in individual specification sections. This list is provided for convenience to the Construction Manager and is not intended to define all abbreviations use in the Contract Documents.

1. Abbreviations for contract and specifications.

EPA	United States Environmental Protection Agency
HHS	US Department of Health and Human Services
HVAC&R	Heating, ventilating, air conditioning, and refrigeration systems
IAQ	Indoor Air Quality
IEQ	Indoor Environmental Quality
DEP	Department of Environmental Protection.
MSDS	Material Safety Data Sheet
NIC	Not in Contract
OFCI	Owner Furnished, Contractor Installed
OFI or OFOI	Owner Furnished and Installed
TJC	The Joint Commission (formerly JCAHO - Joint Commission on Accreditation of Healthcare Organizations)
VOC	Volatile Organic Compounds

2. Abbreviations for measurements and quantities:

C	Celsius
cm	Centimeter
F	Fahrenheit
Hrs	Hours
Kg	Kilogram
L	Liter
M	meter
m^2 or SM	square meter
m^3 or CM	cubic meter
mm	Millimeter
Mths	Months
psi	Pounds per square inch
t	ton

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1.3 DEFINITIONS

A. Definitions of contracting parties (Owner, Owner's Project Manager, General, and Architect): Refer to Section 011000 – PROJECT SUMMARY.

B. Definitions for terms utilized in the Contract Documents:

1. "As necessary," "as directed," "when directed," "satisfactory," "good and sufficient," "approved," or other general qualifying terms are used on the Drawings: These terms are deemed to be followed by the words, "in the opinion of the Architect," or "by the Architect," as the case may be."

2. "Addenda": written or graphic instruments issued prior to the execution of the Contract which modify or interpret the Bidding Documents, including the Drawings and Specifications, by additions, deletions, clarifications or corrections.

3. "Approval," "approved, "approved equal," "or equal," or "other approved" means as approved by the Architect."

4. The terms "Contractor", "General Contractor", and "Construction Manager" as used in the Project Manual have the same meaning and are interchangeable in Contract Documents. These terms refer to the same entity.

5. The term "Day": is defined as the following:
   a. The term "calendar day" is a full 24 hour period, starting from 12 AM (midnight), and includes all weekends and legal holidays.
   b. The term "working day" shall mean any calendar day except Saturdays, Sundays, and legal holidays at the place of the building.
   c. Where the term "day" is used without the adjective of "calendar" or "working", it shall mean "calendar day".

6. Furnish and Install" or "Provide": items identified shall be furnished and installed under this Contract. The term "Furnish", when used separately, shall mean that the items referred to shall be furnished, only. Similarly the term "install", when used separately, shall mean that the items referred to shall be installed, only.

7. "Knowledge," "recognize" and "discover," their respective derivatives and similar terms in the Contract Documents, as used in reference to the Construction Manager, shall be interpreted to mean that which the Construction Manager knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill and diligence required by the Contract Documents. Analogously, the expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a Construction Manager familiar with the Project and exercising the care, skill and diligence required of the Construction Manager by the Contract Documents.

8. "Not in Contract" or "N.I.C.": equipment, furnishings, or other materials not included as a part of this Contract.

9. "Product": materials, systems and equipment.

1.4 REFERENCE STANDARDS

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by DATE OF ISSUE for Contract Documents, current on date of Owner- Construction Manager Agreement.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

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D. The contractual relationship to the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

E. Schedule of References:

1. Listed below are abbreviations for the names and titles of trade association names, federal government agencies and similar organizations which are referenced in the individual specification sections. The addresses and phone numbers provided are for the Construction Manager's convenience and are believed to be current and accurate, however addresses and phone numbers frequently change, and no assurance is made on their accuracy:

AA	Aluminum Association 900 19th Street N.W., Suite 300 Washington, DC 20006 www.aluminum.com
AAMA	American Architectural Manufacturer's Association 1827 Walden Office Sq., Suite 104 Schaumburg, IL 60173-4268 www.aamanet.org
ACI	American Concrete Institute, International 38800 Country Club Drive, Farmington Hills, Michigan 48331 www.aci-int.org
ADC	Air Diffusion Council 104 S. Michigan Ave, Suite 1500, Chicago, IL 60603 www.flexibleduct.org
AFPA	American Forest & Paper Association (Formerly NFPA National Forest Products Association) 1111 19th St. N.W., Suite 800, Washington, DC 20036 www.afandpa.org
AGA	American Gas Association Inc. 1515 Wilson Blvd. Arlington, VA 22209-2469 www.agagas.com
AGAI	American Galvanizers Association Inc. 12200 E.Lliff Ave, Suite 204, Aurora, CO 80014-1252 www.galvanizeit.org
AIA	American Institute of Architects 1735 New York Avenue, N.W., Washington, DC 20006-5292 www.aia.org
AIHA	American Industrial Hygiene Association 2700 Prosperity Ave, Suite 250, Fairfax VA 22031 www.aiha.org
AISC	American Institute of Steel Construction 1 E. Wacher Dr., Suite 3100, Chicago,IL 60601-2001 www.aisc.org
AMCA	Air Movement and Control Association 30 W. University Drive, Arlington Heights, IL 60004-1893 www.amca.org
ANSI	American National Standards Institute 11 W. 42nd Street, 13 Floor, New York, NY 10036 www.ansi.org
APA	APA - The Engineered Wood Association (formerly APA - American Plywood Association) P.O. Box 11700, Tacoma, WA 98411-0070 www.apawood.org

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ARI	Air-Conditioning and Refrigeration Institute 4301 N. Fairfax Dr., Suite 425, Arlington, VA 22203 www.ari.org
ASCA	Architectural Spray Coaters Association 230 West Wells Street, Suite 311, Milwaukee WI 53203 www.aecinfo.com
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers 1791 Tullie Circle NE, Atlanta GA.30329 www.ashrae.org
ASME	American Society of Mechanical Engineers 345 East 47th Street, New York, NY 10017-2392 www.asme.org
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive, West Conshohocken, PA 19428 www.astm.org
AWI	Architectural Woodwork Institute 1952 Isaac Newton Square W., Reston, VA 20190 www.awinet.org
AWPA	American Wood Preservers' Association P.O. Box 286, Woodstock, MD 21163-0286 www.awpa.com
AWPI	American Wood Preservers' Institution 1945 Old Gallows Rd., Suite 150, Vienna, VA 22182 www.oas.org
AWS	American Welding Society 550 LeJeune Road, N.W., Miami, FL 33126 www.aws.org
BHMA	Builders Hardware Manufacturers Association, Inc. 355 Lexington Ave., 17 Floor New York, NY 10017 www.buildershardware.com
CISCA	Ceilings & Interior Systems Construction Association 579 W. North Ave., Suite 301, Elmhurst, IL 60126 www.cisca.org
CRI	Carpet and Rug Institute 310 Holiday Ave, Dalton, GA 30720 ww.carpet-rug.com
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Road, Schaumburg, IL 60173-4758 www.crsi.org
CPSC	Consumer Product Safety Commission 5401 Westbard Ave., Bethesda, MD 20816-1469 www.cpsc.gov
CTIOA	Ceramic Tile Institute of America 12061 W.Jefferson BLVD, Culver City, CA 90230-6219 www.ctioa.org
DHI	Door and Hardware Institute 14170 Newbrook Dr., Chantilly, VA 22021-2223 www.dhi.org
FM	Factory Mutual Engineering & Research Corp. 1151 Boston-Providence Turnpike Norwood, MA 02062

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	www.fmglobal.com
GA	Gypsum Association 6525 Belcrest Road, Suite 480, Hyattsville, MD 20782 www.gypsum.org
GANA	Glass Association of North America 2945 S.W. Wanamaker Dr., Suite A, Topeka, KS 66612-5321 www.glass.org
GICC	Glazing Industry Code Committee 3310 Harrison St., Topeka, KS 66611-2279 www.glazingcodes.net
IGCC	Insulating Glass Certification Council 3933 US Route 11, PO Box 2040, Cortland, NY 13045 www.igcc.org
LSGA	Laminators Safety Glass Association 3310 Harrison Street, Topeka KS 66611-2279 www.glass.org
MIL	Military Specifications and Standards Naval Publications and Forms Center 5801 Tabor Avenue, Philadelphia, PA 19120 www.milspec.com
NAAMM	National Association of Architectural Metal Manufacturers 8 South Michigan Avenue, Suite 1000, Chicago, IL 60603 www.naamm.org
NEBB	National Environmental Balancing Bureau 8575 Government Circle, Gaithersburg, MD 20877-4121 www.nebb.org
NEMA	National Electrical Manufacturers' Association 1300 N. 17th St., Suite 1846, Rosslyn, VA 22209 www.nema.org
NFPA	National Fire Protection Association 1 Battery March Park, PO Box 9101, Quincy, MA 02269 www.nfpa.org
NFRC	National Fenestration Rating Council 6305 Ivy Lane, Greenbelt MD 20770 www.nfrc.org
NRCA	National Roofing Contractors Association 10255 W. Higgins Road, Suite 600, Rosemont, IL 60018-5607 www.nrca.net
PCA	Portland Cement Association 5420 Old Orchard Road, Skokie, IL 60077-1083 www.cement.org
PS	Product Standard U. S. Department of Commerce www.omg.org
SDI	Steel Deck Institute P.O. Box 25, Fox River Grove, IL 60021-0025 www.sdi.org
SDI	Steel Door Institute 30200 Detroit Road, Cleveland, OH 44145-1967 www.steeldoor.org

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SGCC	Safety Glass Certification Council RMS, P.O. Box 9 Henderson Harbor, NY 13651 www.sgcc.org
SIGMA	Sealed Insulating Glass Manufacturers Association 401 N. Michigan Ave., Suite 2400, Chicago, IL 60611 www.glasschange.com
SJI	Steel Joist Institute 3127 10th Ave. N., Myrtle Beach, SC 29577 www.steeljoist.org
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association 4201 Lafayette Center Dr., Chantilly, VA 22022-1209 www.smacnapa.org
SPIB	Southern Pine Inspection Bureau 4709 Scenic Highway, Pensacola, FL 32504-9094 www.spib.org
SSMA	Steel Stud Manufacturer's Association 8 South Michigan Avenue, Chicago IL 60603 www.ssma.com
SSPC	The Society for Protective Coatings 40 24th Street, 6th Floor, Pittsburgh PA 15222-4623 www.sspc.org
SWRI	Sealant, Waterproofing & Restoration Institute 2841 Main Street, Suite 585, Kansas City, MO 64108 www.swrionline.org
TCNA	Tile Council of North America, Inc. 100 Clemson Research Blvd., Anderson, SC 29625 www.tileusa.com *(formerly TCA, Tile Council of America)*
UL	Underwriters' Laboratories, Inc. 333 Pfingston Road, Northbrook, IL 60602 www.ul.com
WDMA	Window & Door Manufacturers Association (formerly National Wood Window & Door Association, NWWDA) 205 E. Touhy Avenue, Suite G-54, Des Plaines, IL 60018 www.nwwda.org

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

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SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Requirements for temporary facilities and controls, including but not limited to the following:

1. Temporary telecommunications services.
2. Temporary sanitary facilities.
3. Temporary barriers and interior enclosures.
4. Security requirements.
5. Vehicular access and parking.
6. Waste removal facilities and services.
7. Project identification sign.
8. Field offices.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 015100 - TEMPORARY UTILITIES.

E. Section 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS.

1.3 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.

B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

C. ANSI A 10 - Safety Requirements for Construction and Demolition.

D. NFPA 70 - National Electrical Code.

E. NFPA 241 - Building Construction and Demolition Operations.

1.4 GENERAL REQUIREMENTS

A. The Construction Manager shall provide and maintain all temporary facilities, controls, and construction aids as specified herein, until they are replaced by permanent work, or until Project Substantial Completion, as appropriate.

1. Temporary facilities removed from the Project shall remain the property of the Contractor, except as otherwise specified.

B. Except where specifically noted otherwise, cost or use charges for temporary facilities, utility services, controls, and construction aids and similar items specified in this Section or as required to perform the Work, are not chargeable to the Owner or Architect, and will not be accepted as a basis of claims for a Change Order.

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C. Establish and initiate use of each temporary facility at time first reasonably required for proper performance of the Work. Terminate use and remove facilities at earliest reasonable time when they are no longer needed, or when permanent facilities have, with authorized use, replaced the temporary facilities.

1. Locate temporary facilities where they will serve Project adequately and result in minimum interference with performance of the Work.

1.5 SUBMITTALS

A. Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

1. Reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.

2. Schedule showing implementation and termination of each temporary utility within 15 days of commencement of the Work.

3. Shop drawings:

a. Temporary signage.

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

1.6 FIRST AID AND FIRE EXTINGUISHERS

A. First aid supplies: Comply with governing regulations.

B. Fire extinguishers: Provide and maintain on site, adequate fire extinguishers UL rated for A-B-C type fires. Provide red-painted plywood standards for each extinguisher. Additionally provide a dry chemical fire extinguisher at each location where welding, torch cutting and other similar hazardous work is in progress.

1. At welding and heat cutting work: Provide not less than a Multi-purpose dry chemical type (mono amonium phosphate) fire extinguisher, 20 pound capacity, multi-purpose rated “2A, 120 B:C”.

1.8 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:

1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.

2. Telephone Land Lines: One line, minimum; one handset per line.

3. Internet Connections: Minimum of one; DSL modem or faster.

4. Facsimile Service: Dedicated fax machine/printer, with dedicated phone line.

1.9 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.10 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and

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to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.11 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1. STC rating of 35 in accordance with ASTM E90.

2. Maximum flame spread rating of 75 in accordance with ASTM E84.

C. Paint surfaces exposed to view from Owner-occupied areas.

1.12 FIRE PREVENTION MEASURES

A. Prior to commencement of work at the site, the Owner's Representative and Construction Manager shall meet with the Local Fire Marshal to plan site and building access in the event of fire.

1. Access paths for heavy firefighting equipment shall be laid out and maintained.

2. Free access from streets to fire hydrants and to outside connections for standpipes, sprinklers or other fire extinguishing equipment shall be provided and maintained.

B. The Contractor shall take all necessary precautions for the prevention of fire during construction. Install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes. Ascertain and comply with requirements of Project insurance carrier, local fire department and the state fire marshal.

1. Maintain the area within contract limits orderly and clean.

a. Remove combustible rubbish promptly from the site and when required, store combustible materials in containers in fire-safe locations.

2. Maintain clear access to exits from within the building.

3. Smoking is not permitted in the building or adjacent areas.

C. Establish procedures for fire protection for welding, cutting and open torch work, and other potentially hazardous operations. Obtain permission from local authorities having jurisdiction for such work as required by law. Provide special fire extinguishers at welding and torch cutting work.

1. Maintain a fire watch when existing fire protection and warning systems have been temporarily de-activated. Maintain watch during all working hours for full period of de-activation.

D. Provide for outside storage of gas tanks, sufficiently clear of any structure. Promptly remove welding and cutting equipment from the building when no longer required. Do not store welding or cutting materials within the building when work is not being performed.

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E. Permanent fire protection system may be activated to meet these requirements. Replace fusible link heads and other expended or discharged components at time of Substantial Completion.

1.13 SECURITY MEASURES

A. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry. Maintain security program throughout construction period until Owner occupancy precludes the need for Contractor security.

1. Construction Manager is responsible for security of site during construction, including, prevention of illegal trespassing, unauthorized entry, theft and vandalism. All losses and damages which occur are the full responsibility of the Construction Manager, who shall bear all costs incurred.

1.14 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Designated existing on-site roads may be used for construction traffic.

F. A limited temporary parking area will be available to accommodate construction personnel. The space available will be viewed at the Pre-Bid Conference. When site space is not adequate, provide additional off-site parking.

1.15 VEHICULAR TRAFFIC CONTROL

A. The Contractor shall not close or obstruct any portion of any street public or private, without obtaining permits therefore from the proper authorities.

1. Provide and pay for traffic details at any time that construction takes place in a public street (right of way). The Contractor is responsible for coordinating, requesting. and paying for traffic details.

B. Construction parking control: Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.

1. Monitor parking of construction personnel private vehicles in existing facilities. Maintain free vehicular access to and through parking areas. Prohibit parking on or adjacent to access roads, or in non-designated areas.

C. Vehicle and Equipment Security: Lock all unattended vehicles including construction machinery and equipment. Do not leave vehicles or equipment unattended accessible to public with the motor running, or with keys easily accessible.

D. Haul routes: Consult with governing authorities and establish public thoroughfares which will be used as haul routes and site access. Confine construction traffic to designated haul routes.

1. Confine construction traffic to designated haul routes.

2. Provide traffic control at critical areas of haul routes to expedite traffic flow and to minimize interference with normal public traffic.

E. Traffic signals and signs: Provide, operate and maintain temporary equipment, services, and personnel, with traffic control and protective devices, as required to direct and maintain an orderly flow of traffic in all areas under Contractors control, or affected by Contractors

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operations, including but not limited to haul routes, at site entrances, at on-site access roads, and parking areas during construction.

1. Provide traffic control and directional signs as needed to direct construction and public traffic.
2. Provide warning signs for public traffic and "STOP" signs for entrance onto public roads.
3. Comply with signage and traffic control requirements of authorities having jurisdiction.

1.16 DUST CONTROL

A. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1. Take all necessary measures and provide equipment and materials to minimize dust from rising and blowing across the site and also to control surface water throughout the operation so that it does not run onto paved ways without being filtered. Control all dust created by construction operations and movement of construction vehicles, both on site and on paved ways.
2. During the progress of the work, maintain the areas of construction activities including sweeping and sprinkling of streets as necessary. Provide and use calcium chloride for more effective dust control, when deemed necessary by regulatory agencies, without additional cost to the Owner.

B. Construction Entrances: Stabilized construction entrances shall be installed at all points of access to reduce or eliminate tracking or flowing of sediment onto the town roads in accordance with the following criteria:

1. Provide nominal 1 to 2-1/2 inch washed crushed stone, minimum 8 inches thick.
2. Construction entrance shall be as wide or wider than all points of ingress and egress.
3. Washing vehicle wheels before traveling on paved ways.
4. Provide temporary swales and interceptor ditches to control runoff water where necessary.

C. Prevent air-borne dust from dispersing into ducts (air supply and return) during construction. Seal all open ends of completed ductwork, and overnight work-in-progress. Inspect ducts on daily basis to ensure seals are intact. Protect ductwork waiting, to be installed with surface wrapping.

1. Ductwork protection during construction is a joint responsibility between the Construction Manager and HVAC subcontractor.
2. HVAC subcontractor is responsible to wipe down internal surfaces of ductwork immediately prior to installation to remove all dust and debris.

D. Prevent air-borne dust from dispersing into Owner occupied spaces (after partial Owner-occupancy, if occurs). Provide interior dust-tight temporary partitions as specified under the Article entitled “Interior enclosures”.

1. Provide air filters over openings and grilles in air-return ducts occurring within construction areas.
2. Provide openings in temporary partitions where air-return grilles occur outside of work areas. In each opening, provide standard 2 inch thick, throw-away type filter having a rated efficiency of 35 percent. Review with Architect size requirements of filtered openings, locations of openings and how many are required.
3. Replace air filters as required to maintain their efficiency.

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1.17 NOISE CONTROL

A. Develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum.

B. Execute construction work by methods and by use of equipment which will reduce excess noise.

1. Equip air compressors with silencers, and power equipment with mufflers.

2. Manage vehicular traffic and scheduling to reduce noise

C. Interior work involving cutting, drilling, hammering or noise generating procedures shall be completed during times schedule with the Owner in advance.

1.18 TEMPORARY WEATHER PROTECTION

A. Protect building interior and all materials and equipment from weather at all times. Where removal of existing roofing, roof sheathing, windows, doors, and other items is necessary to accomplish work, have materials and workmen ready to provide adequate and approve temporary covering of exposed areas.

1. Temporary coverings shall be attended as necessary to insure effectiveness and to prevent displacement.

2. Contractor shall repair or replace all elements of the building damaged by failure to properly protect them from the weather to the satisfaction of the Architect at no additional cost to the Owner.

1.19 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.20 PROJECT IDENTIFICATION AND TEMPORARY SIGNAGE

A. General: Signs other than those specified herein are not permitted, except those required by law or expressly authorized by the Awarding Authority Owner.

1. At all times during the project, signage must clearly direct occupants and the general public in the safe use of the building. Signs must clearly indicate areas of no admittance, and further must clearly define and direct users to building entries, exits, and other important destinations.

a. All such interim signage must be painted by a professional sign painter on 3/4-inch medium density overlay plywood with letters no less than 3 inches in height.

b. Coordinate required signage with Architect/Engineer.

B. Project sign:

1. Provide 8 foot wide by 4 foot high foot project sign of exterior grade MDO plywood and wood frame construction, painted, with exhibit lettering by professional sign painter to Architect/Engineer's design and colors.

2. List title of project, names of Owner, Architect/Engineer, professional sub-consultants, Contractor, and major subcontractors.

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3. Erect on site at location established by Architect/Engineer.

1.21 FIELD OFFICES

A. Availability of Field Office space will be coordinated through the Owner and the Construction Manager.

B. General:

1. Designated existing spaces may be used for field offices and for storage.

2. Availability: Provide offices ready for occupancy within 15 days after date fixed in Notice to Proceed.

3. General: Existing facilities shall not be used for field offices and for storage.

4. Availability: Provide offices ready for occupancy within 15 days after date fixed in Notice to Proceed.

5. Field offices: Provide furnished, insulated, weather tight, office(s) which shall be portable or mobile building(s), or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.

6. Location: The location of the field office(s) and storage areas for equipment and materials shall be upon cleared portions of the job site or areas to be cleared, and shall require review and written acceptance of the Architect/Engineer. Submit plans showing field office and storage facilities for equipment and materials for acceptance by the Architect.

a. Offices and sheds located within the construction area, or within 30 feet of building lines shall be of noncombustible construction. Comply with requirements of NFPA 241.

7. General:

a. Contractor shall provide periodic cleaning and maintenance of field offices and storage areas.

b. Provide air conditioning and heating to maintain a temperature range of 65 to 78 degrees F.

C. Contractor's field office(s): Provide habitable office(s) or space, as coordinated between the Owner and the Contractor.

1.22 SANITARY FACILITIES

A. Sanitary facilities: Provide self-contained single-occupant chemical toilet units, wash facilities and drinking water fixtures.

B. Provide toilet tissue, paper towels, paper cups, cleaning compounds and similar materials.

C. Maintain facilities, through-out term of construction, and keep clean, provide covered waste containers for used material.

1.23 TEMPORARY BARRICADES

A. Provide barriers and barricades to prevent unauthorized entry to construction areas.

1. Comply with standards and code requirements for erection of barricades, where required provide lighting, including flashing lights.

2. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against.

3. Provide special barriers necessary to protect entrances and areas around building and to prevent persons from coming in contact with material or construction operations.

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B. Provide temporary enclosures, as required, for protection of existing facilities and new construction from exposure to weather, other construction operations and similar activities. Where heat is needed and the building envelope is incomplete, provide enclosures where there is no other provision for containment of heat.

1. Provide doors with self-closing hardware and locks.

C. Provide temporary roofing as needed to maintain the building water tight.

1.24 TEMPORARY FENCES

A. Construction fence: Provide a 8 foot high commercial grade chain link fence around construction site; equip with vehicular and pedestrian gates and locks.

1. Relocation of all fences and gates as required due to construction phasing. Relocations shall be provided at no additional cost to the Owner.

B. Fence, General: Fence shall be industrial-grade, heavy-duty construction: Galvanized fabric with galvanized frame.

1. Chain link fabric shall be made of coated-steel, 9 gage (0.148 inch) core wire woven in 2-inch uniform mesh, height (roll width) to suit fence height, with bottom selvage knuckled, top selvage twisted, with woven fabric having a minimum breaking strength of 1290 pounds.

2. Framework: Posts and rails shall be sized as detailed on the drawings , Type 1 seamless steel pipe, ASTM A-120, standard weight schedule 40, hydrostatic testing waived.

3. Gate Posts: Standard weight pipe 2-7/8 inches OD nominal weight, 5.79 pounds per foot.

4. Gate Frames: 2 inches OD standard weight pipe, 2.73 pounds. per foot with heavy malleable iron or pressed steel corner fittings securely riveted. Fabric to match the fence shall be installed in the frame by means of tension bars and hook bolts. Each frame to be equipped with 3/8 inches diameter adjustable truss rods.

5. Bottom hinges to be ball and socket type designed to carry the weight of the gate on the post footing. Upper hinge to be wrap around adjustable type. All gates to be equipped for padlocking and with semi-automatic outer catches to secure gates in opened position.

6. Fittings: Pressed steel or malleable iron, hot-dipped galvanized conforming to the requirements of ASTM A153. Tie wires shall be minimum nine-gage galvanized wire,. Attachment bolts shall be galvanized.

7. Post Settings: Driven into ground. Temporary concrete bases may be considered where fencing is scheduled for relocation.

1.25 TREE AND PLANT PROTECTION

A. General: Comply with requirements specified in Divisions 31 and 32, in addition to those specified herein.

B. Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line.

C. Provide temporary guards to protect trees and vegetation to be left standing. Protect plant life by placing boards, planks, poles or fencing around them.

D. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

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E. Soil: Protect soil from contamination with toxic materials that are detrimental to plant growth.

F. Provide protection for roots over 1-1/2 inch in diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt or other acceptable coating formulated to use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

G. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations in a manner acceptable to Architect.

1. Plant life or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor.

2. Employ a licensed arborist to repair damage to trees and shrubs. Replace trees that cannot be repaired and restored to full-growth status.

a. The Architect/Engineer will decide whether damaged trees shall be treated, or be removed and replaced.

H. A reasonable sum (cost of equivalent replacement) will be deducted from the Contract Sum for any permanent damage to existing trees or plantings which are outside the construction site area but on the Owner's property or within the construction site area, and areas designated to be protected. Damage to trees and plants off the Owner's property shall be fully the responsibility of the General Contractor.

1.26 POLLUTION CONTROL

A. Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by, the discharge of noxious substances from construction operations.

1. Comply with all applicable Federal, State, County, and municipal laws regarding pollution.

2. Prevent pollution of streams, lakes, or reservoirs with fuels, oils, bitumens, calcium chloride, acids, waste products, effluents, chemicals or other harmful substances. Prevent from such substances from entering storm drains and sanitary sewers.

B. Provide equipment and personnel, perform emergency measures required to contain any spillage and to remove contaminated soils or liquids.

1. Excavate and legally dispose of any contaminated earth off-site, and replace with suitable compacted fill and topsoil.

1.27 REMOVAL OF TEMPORARY FACILITIES AND CONTROLS

A. Remove temporary equipment, facilities, and materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

D. Restore new permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

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SECTION 015100

TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Temporary Utilities: Electricity, lighting, heat, ventilation, and water.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 015000 - TEMPORARY FACILITIES AND CONTROLS:

1. Temporary telecommunications services for administrative purposes.
2. Temporary sanitary facilities required by law.

C. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

D. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

1.3 TEMPORARY ELECTRICITY

A. Cost: By Owner.

B. Connect to Owner's existing power service.

1. Do not disrupt Owner's need for continuous service.
2. Exercise measures to conserve energy.
3. Coordinate use and connections with the Owner.

C. Provide temporary electric feeder from existing building electrical service at location as directed.

D. Complement existing power service capacity and characteristics as required.

E. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

F. Provide main service disconnect and over-current protection at convenient location.

G. Permanent convenience receptacles may be utilized during construction.

H. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft (21 watt/sq m).

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

C. Maintain lighting and provide routine repairs.

1.5 TEMPORARY HEATING

A. Cost of Energy: By Construction Manager.

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B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.

C. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.

D. Owner's existing heat plant may be used as permitted by the Owner.

1. Exercise measures to conserve energy.

2. Coordinate use and connections with the Owner.

E. The use of permanent equipment for temporary heat or AC will not be allowed.

1.6 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors or gases. The contractor is to provide the equipment necessary to provide for such proper ventilation.

1.7 TEMPORARY WATER SERVICE

A. Cost of Water Used: By Owner.

B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

C. Connect to existing water source.

1. Exercise measures to conserve water.

D. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.8 REMOVAL OF TEMPORARY UTILITIES

A. Remove temporary utilities prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

D. Restore new permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 016000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. General product requirements.
2. Re-use of existing products.
3. Transportation, handling, storage and protection.
4. Product option requirements.
5. Substitution limitations and procedures.
6. Procedures for Owner-supplied products.
7. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 014000 - QUALITY REQUIREMENTS: Product quality monitoring.

C. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

D. Section 016200 - PRODUCT SUBSTITUTIONS: Procedures for requesting product substitutions.

E. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

1.3 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
1. Submit within 15 days after date of Agreement.
2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 - PRODUCTS

2.1 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

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B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.2 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Do not use products having any of the following characteristics:
1. Made using or containing CFC's or HCFC's.
2. Made of wood from newly cut old growth timber.

C. Where all other criteria are met, Contractor shall give preference to products that:
1. Are extracted, harvested, and/or manufactured closer to the location of the project.
2. Have longer documented life span under normal use.
3. Result in less construction waste.
4. Are made of vegetable materials that are rapidly renewable.

2.3 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.4 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 - EXECUTION

3.1 SUBSTITUTION PROCEDURES - BIDDING PHASE

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. Substitution Submittal Procedure:
1. Limit each request to one proposed substitution.
2. Submit request per requirements of and with "Substitution Request Form" form attached to Section 016200 - PRODUCT SUBSTITUTIONS.

3.2 OWNER-SUPPLIED PRODUCTS

A. Owner's Responsibilities:
1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
2. Arrange and pay for product delivery to site.
3. On delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

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B. Contractor's Responsibilities:
   1. Review Owner reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

3.3 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Prevent contact with material that may cause corrosion, discoloration, or staining.

I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

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SECTION 016200

PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Product substitutions.

1.2 RELATED SECTIONS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

1.3 SUBSTITUTIONS

A. Base Bid shall be in accordance with the Contract Documents.

B. After the end of the bidding period, substitution requests will be considered by the Architect only in case of:

1. Product unavailability.

2. Other conditions beyond the contractor's control.

C. Substitutions will not be considered for acceptance when:

1. A substitution is indicated or implied on shop drawings or product data submittals without a formal request from the Contractor.

2. Acceptance will require substantial revision of Contract Documents.

3. In the judgement of the Architect, the substitution request does not include adequate information necessary for a complete evaluation.

4. Requested directly by a subcontractor or supplier.

D. The Architect will determine acceptability of proposed substitutions.

E. No verbal or written approvals other than by Addendum or Change Order will be valid.

1.4 SUBMITTALS

A. Submit a separate request for each substitution. Support each request with complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:

1. Product identification, including manufacturer's name and address.

2. Manufacturer's literature, identifying:

a. Product description.

b. Reference standards.

c. Performance and test data.

3. Samples, as applicable.

4. Name and address of similar projects on which product has been used and date of each installation.

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5. Itemized comparison of the proposed substitution with product specified, listing significant variations.
6. Data relating to changes in construction schedule.
7. Effects of substitution on separate contracts.
8. List of changes required in other work or products.
9. For post-bid substitution requests, accurate cost data comparing proposed substitution with product specified, including amount of net change to the Contract Sum.
10. Designation of required license fees or royalties.
11. Designation of availability of maintenance services and sources of replacement materials.

1.5 QUALITY ASSURANCE

A. In making formal request for substitution the Contractor represents that:

1. The proposed product has been investigated and it has been determined that it is equivalent to or superior in all respects to the product specified.
2. The same warranties or bonds will be provided for the substitute product as for the product specified.
3. Coordination and installation of the accepted substitution into the Work will be accomplished and changes as may be required for the Work to be complete will be accomplished.
4. Claims for additional costs caused by substitution that may subsequently become apparent will be waived by the Contractor.
5. For post-bid substitution requests, complete cost data is attached and includes related costs under the Contract, but does not include:
   a. Costs under separate contracts.
   b. The Architect's costs for redesign or revision of the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not order or install substitute products without written acceptance of the Architect.

3.2 PRODUCT SUBSTITUTION REQUEST FORM

A. Refer to Document 016200.1 - SUBSTITUTION REQUEST FORM, following this section.

B. Substitutions will be considered only when the attached form is completed and included with the submittal with back-up data.

C. All product substitution requests shall be made to the Architect through the Project Coordinator.

END OF SECTION

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SECTION 016200.1

SUBSTITUTION REQUEST FORM

E4H Environments for Health Architecture
183 Middle Street, 3rd Floor
Portland, ME 04101
Attention: Brian Laderbush, Project Manager

We hereby submit for your consideration the following product instead of the specified item:

DRAWING NO. _____ DRAWING NAME _____

SPEC. SECT. SPEC NAME PARAGRAPH SPECIFIED ITEM

_____ _____ _____ _____

Proposed Substitution: _____

Attach complete information on changes to Drawings and/or Specifications that proposed substitution will require for its proper installation.

Submit with request necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

The undersigned certifies that the function, appearance and quality are of equal performance and assumes liability for equal performance, equal design and compatibility with adjacent materials.

Submitted By:

_____ _____
Signature (Contractor) Title

_____
Name

_____
Firm

_____
Address

_____ _____
Telephone Date

Signature shall be by person having authority to legally bind the Contractor to the above terms. Failure to provide legally binding signature will result in retraction of approval.

(See second page for additional information to be provided)

Greater Portland Health
63 Preble Street
Portland, ME 04101

E4H Environments for Health Architect
Project No. 2017(
July 26, 2(

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For use by the Architect

___ Recommended ___ Recommended as noted
___ Not Recommended ___ Insufficient data received

by _____ date _____

For use by the Owner

___ Approved ___ Approved as noted
___ Not Approved ___ Insufficient data received

by _____ date _____

Fill in blanks below:

A. Does the substitution affect dimensions indicated on the Drawings?
Yes ____ No _____ if yes, clearly indicate changes.

_____

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?

Yes ____ No _____ if no, fully explain: _____

_____

C. What effect does the substitution have on other Contracts or other trades?

_____

D. What effect does the substitution have on construction schedule?

_____

E. Manufacturer's warranties of the proposed and specified items are:

Same _____ Different _____ Explain: _____

_____

F. Reason for Request:

_____

G. Itemized comparison of specified item(s) with the proposed substitution; list significant variations:

_____

_____

H. This substitution will amount to a credit or extra cost to the Owner of:

_____

I. Designation of maintenance services and sources:

_____

(Attach additional sheets if required)

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SECTION 017000

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Examination, preparation, and general installation procedures.
2. Pre-installation meetings.
3. Cutting and patching.
4. Surveying for laying out the work.
5. Cleaning and protection.
6. Starting of systems and equipment.
7. Demonstration and instruction of Owner personnel.
8. Closeout procedures, except payment procedures.
9. General requirements for maintenance service.

1.2 RELATED REQUIREMENTS

A. Section 011000 - SUMMARY: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 013000 - ADMINISTRATIVE REQUIREMENTS: Submittals procedures.

C. Section 014000 - QUALITY REQUIREMENTS: Testing and inspection procedures.

D. Section 015000 - TEMPORARY FACILITIES AND CONTROLS:

1. Temporary exterior enclosures.
2. Temporary interior partitions.

E. Section 015100 - TEMPORARY UTILITIES: Temporary heating, cooling, and ventilating facilities.

F. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

G. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

H. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

I. Section 017800 - CLOSEOUT SUBMITTALS: Project record documents, operation and maintenance data, warranties and bonds.

J. Section 024119 – SELECTIVE DEMOLITION: Demolition of whole structures and parts thereof; site utility demolition.

K. Section 078400 - FIRESTOPPING.

L. Individual Product Specification Sections:

1. Advance notification to other sections of openings required in work of those sections.

1.3 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2009.

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1.4 SUBMITTALS

A. See Section 013000 - ADMINISTRATIVE REQUIREMENTS, for submittal procedures.

B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.

1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
2. Identify demolition firm and submit qualifications.
3. Include a summary of safety procedures.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate Contractor.
6. Include in request:
   a. Identification of Project.
   b. Location and description of affected work.
   c. Necessity for cutting or alteration.
   d. Description of proposed work and products to be used.
   e. Effect on work of Owner or separate Contractor.
   f. Written permission of affected separate Contractor.
   g. Date and time work will be executed.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.5 QUALIFICATIONS

A. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

B. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.6 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

C. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

D. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

E. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

F. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

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G. Pollution Control: Provide methods, means, and facilities to prevent contamination of so.., water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.7 COORDINATION

A. See Section 011000 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 - PRODUCTS

2.1 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution as described in Section 016000 - PRODUCT SUBSTITUTIONS.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

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F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of examination, preparation and installation procedures.

2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that indicated on Drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.

J. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.

2. Grid or axis for structures.

3. Building foundation, column locations, ground floor elevations.

K. Periodically verify layouts by same means.

L. Maintain a complete and accurate log of control and survey work as it progresses.

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M. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

3.5 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:

1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-conforming work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 078400, to full thickness of the penetrated element.

I. Patching:

1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

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3.7 PROGRESS CLEANING

A. Maintain areas daily and more frequently if required to be free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Areas outside the construction that are affected by the use of the contractors are to be kept clean at all times. These areas must not show signs of dust or debris at any time.

C. All transport of materials outside the construction area must be in an appropriate container and completely covered until outside the facility.

D. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

E. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

F. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

G. Clean up spillage and wind-blown debris from adjacent public and private lands.

3.8 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.9 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and Owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

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H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Replace all filters of operating equipment just prior to Owner occupancy.

G. Clean debris from roofs, gutters, downspouts, and drainage systems.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

1. Provide copies to the Architect.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in Contractor's Notice of Final Completion.

C. Notify Architect when work is considered ready for Final Completion.

D. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.

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E. Accompany Project Coordinator on preliminary final inspection.

F. Notify Architect when work is considered finally complete.

G. Complete items of work determined by Architect's final inspection.

3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Final Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

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SECTION 017329

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Examination of existing conditions and acceptance of conditions.

B. Administrative and procedural requirements for cutting and patching, including attendant excavation and backfill as required to complete the Work. Construction Manager is responsible for coordinating all cutting and patching work, including but not limited to:

1. Perform all cutting, altering, patching, and fitting of the Work (new and existing) as necessary for the Work and the existing improvements. Fully integrate with existing and new construction, all cutting, alterations and patching, to present the visual appearance of an entire, completed, and unified project.

   a. Make all products and their components of the work fit together properly.

2. Provide openings in elements of the Work, and the patching of same, for penetrations required by all trades, including but not limited to mechanical, plumbing, fire protection and electrical work.

   a. Individual trades are responsible for designated types of coring and drilling penetrations for piping, conduit, ducts and other penetrations as defined elsewhere in this Section.

3. Uncover work to provide for installing, inspecting, or both, of ill-timed work;

4. Remove and replace work not conforming to requirements of the Contract Documents or as otherwise determined to be defective.

5. Patch and match all surfaces and products disturbed or damaged by the Work.

6. Remove samples of installed work as specified for testing.

1.2 RELATED REQUIREMENTS

A. Section 024119 - SELECTIVE DEMOLITION: Demolition of selected portions of the building for new construction.

B. Individual product specification Sections:

1. Cutting and patching of not-exposed-to-view materials incidental to work of the Section.

2. Core drilling (up to 8 inches in diameter) of interior building components, incidental to work of individual Sections.

3. Cutting and Patching work of particular exposed-to-view finish work, performed by trades as specified herein.

1.3 SUBMITTALS

A. Submit written proposals to perform cutting and patching under provisions of Section 013000 – ADMINISTRATIVE REQUIREMENTS. Describe cutting and patching procedures in advance of the time cutting and patching.

1. Submit a written request when cutting work affects the following:

   a. Structural integrity of any element in the project.

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b. Integrity of weather-exposed or moisture-resistant elements.
c. Integrity of any fire suppression, fire alarm, or life safety system.
d. Interruption or disturbance of utilities service. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
e. Efficiency, maintenance, or safety of operational elements and systems.
f. Aesthetic and visual qualities of exposed-to-view elements.
g. Efficiency, operational life, maintenance, or safety of operational elements.
h. Work of Owner or work performed under separate Contract.
i. Owners on-going operations or schedule.

2. Include in the request:
   a. Identification of project.
   b. Location and description of affected work.
   c. Necessity for cutting or alteration.
   d. Alternatives to cutting and patching.
   e. Scope of proposed cutting, patching, alteration or excavation.
   f. List of tradespeople who will execute the work.
   g. Description of products to be used.
   h. Extent of refinishing and cleaning to be performed.
   i. Effect on work by Owner or work performed under separate Contract, and written permission of affected party.
   j. Date and time cutting and patching is scheduled to be executed.
   k. Cost proposal, when applicable.
   l. Written permission of separate contractor(s) whose work will be affected.
3. Review by the Architect does not waive the Architect's right to later require complete removal and replacement of Work found to be unsatisfactory.
4. Should conditions of Work or the schedule indicate a change of products from original installation, Contractor shall submit a request for substitution in accordance with Section 016200 - Product Substitutions.

1.4 QUALITY ASSURANCE

A. Only tradespersons skilled and experienced in cutting and patching shall perform such Work.

B. In performing Work which requires cutting, fixing, or patching, Construction Manager shall oversee and ensure contractor(s) and subcontractors utilize best efforts to protect and preserve the visual appearance and aesthetics of the Project to the reasonable satisfaction of both Owner and Architect.

1.5 PERFORMANCE REQUIREMENTS

A. General performance requirements: Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

B. Structural elements: Do not cut and patch structural elements in a manner that would reduce the load-carrying capacity or load deflection ratio. Always obtain written approval of the cutting and patching proposal before cutting and patching structural elements.

1. Do not drill through structural beams, slabs or columns. Core drilling through concrete block walls and stair platforms must be approved by the Architect.

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2. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.

C. Exposed elements:

1. Employ original installer of new construction to perform cutting and patching for weather exposed and moisture resistant elements, and sight exposed surfaces.

2. Employ an appropriate tradesperson to perform cutting and patching of existing weather-exposed and moisture-resistant construction, and exposed-to-view surfaces.

D. Penetrating elements: Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. At penetrations of fire rated walls, partitions, ceiling or floor construction, completely seal voids with fire rated materials in accordance to applicable codes and regulations, and compatible to surrounding construction.

E. Visual requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

1. General: Restore work with new products in accordance with the requirements of the Contract Documents.

2. Engage a firm recognized and experienced in firestopping for patching of existing firestopping, smoke seals and firesafing in compliance with applicable codes and as additionally required by authorities having jurisdiction. Comply with requirements of Section 078400 - FIRESTOPPING.

F. Operational and safety limitations: Do not cut and patch operating elements or safety components in a manner that would reduce their capacity to perform as intended, or would increase maintenance, or decrease operational life or safety.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:

a. Primary operational systems and equipment.
b. Fire resistance rated barriers and smoke barriers.
c. Fire protection systems.
d. Noise and vibration control elements and systems.
e. Control systems.
f. Communication systems.
g. Electrical wiring systems.

1.6 WARRANTY

A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void existing applicable warranties.

PART 2 - PRODUCTS

2.2 MATERIALS

A. Patching Materials: Use patching materials identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible. Use materials whose installed performance will equal or surpass that of the existing materials. Comply with specifications and standards for each specific product involved.

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1. All materials used shall be approved by the Architect for consistency with the existing surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Pre-bid examination: Construction Manager and contractors shall inform themselves of existing conditions before submitting Contract Price, and are fully responsible for carrying out all work required to completely and properly execute the work of the Contract, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed on account of actual conditions which are inconsistent with those assumed, except for fully concealed conditions.

B. Examination: Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, inspect conditions affecting performance of work. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

C. Layout of cutting and patching in masonry construction. After Construction Manager identifies areas requiring cutting and patching work. Masonry Filed-Sub-contractor shall indicate on walls the extent of masonry cutting work which will be performed by the Construction Manager. Necessary patching of openings will be performed by the Masonry Filed-Sub-contractor.

3.2 PREPARATION

A. Protection:

1. Provide temporary supports to ensure structural integrity of the Work.
2. Protect existing construction during cutting and patching to prevent damage.
3. Provide protection from adverse weather conditions.
4. Provide protection from elements for areas which may be exposed by uncovering work.

3.3 GENERAL CUTTING AND PATCHING

A. Performance: Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive repairs, patching, and finishing.

B. Execute cutting, fitting, and patching, including excavation and fill, to complete the work.

1. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not permitted without prior approval, from Architect
2. Fit products together, to integrate with other work.
3. Uncover work to install ill-timed work.
4. Remove and replace defective or non-conforming work.
5. Remove samples of installed work for testing, when requested.
6. Provide openings in the work for penetration of mechanical and electrical work.

C. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.

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1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
4. Comply with requirements of applicable Division 31 - EARTHWORK Sections where cutting and patching requires excavating and backfilling.
5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

3.4 FINISHING OF PATCHED AREAS

A. General: Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break; for assemblies, refinish entire unit.

1. Patching: Patch with durable seams that are as invisible as possible, showing no evidence of patching and refinishing. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction Comply with specified tolerances.
   a. At penetrations of fire rated walls, partitions, ceiling or floor construction, completely seal voids with fire rated materials in accordance to applicable codes and regulations, and compatible to surrounding construction.
   b. Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Provide vapor and air seal when penetrating existing vapor and air seals.
   c. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
2. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing 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, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat. Extend re-painting to entire surface plane up to where plane changes direction.
3. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.5 CORING AND DRILLING

A. Coring and Drilling of holes incidental to work of individual sections shall be performed by the trade requiring the penetration, except as follows:

1. Coring and Drilling of holes greater than 8 inches in diameter in concrete decks and slabs.

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2. Coring and drilling requiring patching of the following existing surfaces shall be performed by the contractor with patching performed by the appropriate trade or subcontractor.

3. The Construction Manager is responsible for coordinating core drilling in wall and roof surfaces leading to, or from, the outside of the Building.

4. The Construction Manager is responsible for coordination of all coring and drilling and resultant patches necessary for the completion of this Contract and for the quality and appearance of all patch Work in exposed-to-view finished materials.

3.6 CLEANING

A. Cleaning patched areas: Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove paint, mortar, oils, putty and similar items.

END OF SECTION

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SECTION 017419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

A. It is the Owner's intent that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:

1. Aluminum and plastic beverage containers.
2. Corrugated cardboard.
3. Wood pallets.
4. Clean dimensional wood: May be used as blocking or furring.
5. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
6. Plastic buckets.
7. Plastic sheeting.
8. Rigid foam insulation.
9. Plumbing fixtures.
10. Mechanical and electrical equipment.
11. Fluorescent lamps, (light bulbs).
12. Acoustical ceiling tile and panels.

E. Construction Manager shall develop and follow a Waste Management Plan designed to implement these requirements.

F. Methods of trash/waste disposal that are not acceptable are:

1. Burning on the project site.
2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.

G. Regulatory Requirements: Construction Manager is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble, resulting from construction, remodeling, repair and demolition operations.

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C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.3 SUBMITTALS

A. See Section 013000 - ADMINISTRATIVE REQUIREMENTS, for submittal procedures.

B. Waste Management Plan: Include the following information:

1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.

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C. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.

1. Landfill Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
   c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
2. Incinerator Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
   c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
3. Recycled and Salvaged Materials: Include the following information for each:
   a. Identification of material, including those retrieved by installer for use on other projects.
   b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
4. Material Reused on Project: Include the following information for each:
   a. Identification of material and how it was used in the project.

PART 2 - PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

A. See Section 016000 - PRODUCT REQUIREMENTS for substitution submission procedures.

B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 016000:

1. Relative amount of waste produced, compared to specified product.
2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Price.
3. Proposed disposal method for waste product.
4. Markets for recycled waste product.

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

A. See Section 013000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 015000 for additional requirements related to trash/waste collection and removal facilities and services.

C. See Section 016000 for waste prevention requirements related to delivery, storage, and handling.

D. See Section 017000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

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B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Pre-construction meeting.
   2. Regular job-site meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
   3. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
   4. Locate enclosures out of the way of construction traffic.
   5. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   6. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
   7. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

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SECTION 017800

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 013000 - ADMINISTRATIVE REQUIREMENTS: Submittals procedures, shop drawings, product data, and samples.

C. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

D. Section 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS: Contract closeout procedures.

E. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

F. Individual Product Sections: Specific requirements for operation and maintenance data.

G. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

1. Refer to Section 012000 - PRICE AND PAYMENT PROCEDURES for additional information.

B. Operation and Maintenance Data:

1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.

2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.

3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.

4. Submit two sets of final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.

2. Make other submittals within 10 days after Date of Final Completion, prior to final Application for Payment.

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3. For items of Work for which acceptance is delayed beyond Date of Final Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

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A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Fire/Smoke contribution characteristics.
   3. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide Construction Manager's coordination drawings, with color coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual product specification sections.

3.5 OPERATION AND MAINTENANCE MANUALS

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A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: To be updated to AutoCAD to include all sub-contractors information, equipment data, materials, and similar items.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:

1. **Part 1**: Directory, listing names, addresses, and telephone numbers of Architect, Construction Manager, Subcontractors, and major equipment suppliers.
2. **Part 2**: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. **Part 3:** Project documents and certificates, including the following:
   a. Shop drawings and product data.

3.6 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Final Completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

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SECTION 024119

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. General: The work described in this Section consists of selective demolition, cleaning, removal and legal disposal of all structures, equipment and materials indicated for demolition, or careful removal and temporary storage of materials and equipment indicated for salvage and re-use, or salvage and delivery to Owner. No attempt is made in this Section to list the entire scope of selective demolition required on this project or to describe each element to be removed. Drawings indicate both existing construction and final construction. It is the responsibility of the Construction Manager to determine for itself the scope and nature of the existing materials, equipment and finishes required for removal or salvage, based on the information provided in the full set of Contract Documents.

B. Permits: Obtain and pay for all demolition and construction permits required by local authorities having jurisdiction and other regulatory agencies and utility companies.

C. Selective demolition and removal work of building elements for alteration purposes, includes, but is not limited to:

1. Refer to the Drawing **A 000** for scope of demolition work.
2. Demolition work at the First Floor, as indicated on the Drawings, shall be conducted after normal working hours, and shall be coordinated with the Owner and Architect.
3. Remove all furnishings, utilities, equipment and fixtures, not indicated for salvage or re-use, and abandoned materials of all kinds.
4. Remove from site all abandoned, disconnected and dismantled fire protection, plumbing and mechanical equipment, including piping, conduits, system wiring, meters and other devices.
5. Remove from site all abandoned, disconnected and dismantled electrical fixtures and equipment, including conduits, wiring, meters and other devices.
6. In addition to demolition specifically shown, cut, move or remove existing construction to remain as necessary to provide access or to allow alterations and new work to proceed. Coordinate such relocation's and removal to accommodate the demands and requirements of other trades.
7. Removal of unsuitable or extraneous materials not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals and deteriorated concrete.

D. Selective demolition and removal work by individual utility, mechanical and electrical trade subcontractors includes, but is not limited to the following:

1. Each trade subcontractor shall disconnect cut, cap and make safe all utilities, equipment and fixtures which are not indicated for salvage or re-use, or otherwise indicated to be abandoned in place as well as any abandoned materials of any kind.
   a. Disconnect cut, cap and make safe, all utility services indicated to be demolished at their primary source. Obtain the approval from authorities having jurisdiction, or applicable service provider prior to the execution of the work.
   b. Cut, cap and make safe all existing utility services indicated to be abandoned in place, where so indicated on the Drawings.
2. The plumbing subcontractor shall disconnect, detach and dismantle all existing abandoned plumbing systems and equipment including, but not limited to, fixtures, equipment, water heaters, piping, hangers, valves, insulation and appurtenances.
   a. Piping at slab will be disconnected by plumbing contractor.

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b. Suspended hangers, piping, equipment, fixtures and appurtenances scheduled for demolition, shall be disconnected and lowered to floor by the Plumbing trade Subcontractor.

3. The HVAC subcontractor shall disconnect, detach, dismantle all existing abandoned heating, ventilating, and air conditioning systems including, but not limited to, air handlers, air conditioners, pumps, cabinet unit heaters, unit heaters, radiation, exhaust fans, intakes, louvers, diffusers, grilles, and all related piping, ductwork, controls, and appurtenances.
   a. Suspended hangers, equipment, ductwork and appurtenances scheduled for demolition, shall be disconnected and lowered to floor by HVAC subcontractor.
4. The Electrical subcontractor shall disconnect, detach, dismantle all existing abandoned electrical systems and equipment including, but not limited to, panelboards, light fixtures, fire alarm, intercom, speakers, wiring devices, and all related conduit and appurtenances.
   a. Suspended wiring, conduit, hangers, fixtures, equipment, and appurtenances scheduled for demolition, shall be disconnected and lowered to floor by the Electrical subcontractor.
5. Remove, salvage and furnish to the General Contractor designated equipment, fixtures or other items so identified. Refer to notes on Drawings.
6. Identify locations of utilities for work of other sections.

E. Remove, salvage, and furnish to Owner for maintenance stock, or other future use, the following products.
   1. Door hardware.
      a. Carefully package and clearly identify prior to delivery to Owner.

F. Conduct walk-through of existing site prior to commencement of selective demolition work and jointly identify and tag with Owner items required to be salvaged. These products in general would be in addition to those indicated on Drawings.
   1. All salvaged products not designated for re-use in project, shall be furnished to the Owner for their own use, carefully packaged and clearly identified.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 011000 - SUMMARY:
   1. Limitations on Construction Manager's use of site and premises.
   2. Sequencing and staging requirements.
   3. Areas for temporary construction and field offices.
   4. Description of items to be removed by Owner

C. Section 015000 - TEMPORARY FACILITIES AND CONTROLS: Security, protective barriers, and waste removal.

1.3 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2009.

1.4 SUBMITTALS

A. See Section 013000 - ADMINISTRATIVE REQUIREMENTS, for submittal procedures.

B. Areas for temporary construction and field offices.

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C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

E. Design Data: Submit calculations for bracing and shoring, signed and sealed by professional engineer registered in the state of Maine.

F. General: Conduct the work in a manner giving prime consideration to protection of the public; protection from the weather, control of noise, shocks and vibration; control of dirt and dust; orderly access for and storage of materials; protection of existing buildings; protection of adjacent surfaces and property; coordination and cooperation with the Owner at all times.
   1. Comply with all requirements of this contract relative to protection, scheduling and coordination with the Owner.

1.5 QUALITY ASSURANCE

A. General: Conduct the work in a manner giving prime consideration to protection of the public; protection from the weather, control of noise, shocks and vibration; control of dirt and dust; orderly access for and storage of materials; protection of existing buildings; protection of adjacent surfaces and property; coordination and cooperation with the Owner at all times.
   1. Comply with all requirements of this contract relative to protection, scheduling and coordination with the Owner.

B. Shoring and bracing design: Design shoring, and bracing, under direct supervision of Professional Engineer experienced in design of this Work and licensed in the state of Maine.

C. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of five years of documented experience.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCOPE

A. Remove portions of buildings as indicated on the Drawings.

B. Remove any items indicated, for salvage and relocation.

3.2 PREPARATION

A. General: Provide necessary protection of non-work areas during demolition operations. Provide, erect and maintain temporary barriers as required to protect non-construction related pedestrian and vehicular traffic using the adjacent portions of the site and building.
   1. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy of adjacent facility.

B. Protect existing structures which are not to be demolished. Protect designated materials and equipment to be removed and retained by Owner.
   1. Cover or otherwise protect as necessary existing equipment, furniture and furnishing located beyond the immediate demolition work.
   2. Protect existing landscaping materials, structures, and appurtenances which are not to be demolished.

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C. Prevent movement of structure; provide required bracing and shoring.
   1. Protect existing active utility services and structures from damage during selective demolition work including during installation of bracing and removal of same. Repair or replace damages to satisfaction of Owner.

D. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.

3.3 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.
   4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   8. Do not close or obstruct roadways or sidewalks without permit.
   9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

3.4 BRACING

A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace. Provide suitable bracing materials which will support loads imposed

B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Architect.

C. Install internal bracing, if required, to prevent spreading or distortion to braced frames.

D. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand designed live and dead loads.

E. Remove bracing in stages to avoid disturbance or damage to existing structure.

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F. Repair or replace adjacent work damaged or displaced through installation or removal of bracing work.

3.5 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

D. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

E. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

F. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

G. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.6 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings and other locations as determined during construction.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.

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4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

3.7 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; do not burn or bury.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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SECTION 030513

CONCRETE SEALERS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install concrete sealers/coatings on exposed-to-view concrete floors where shown and as scheduled on the Drawings

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - References. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. AASHTO M233 – Boiled Linseed Oil Mixture for Treatment of Portland Cement Concrete.
2. ASTM C156 – Water Retention by Liquid Membrane-Forming Curing Compounds for Concrete.
3. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.
4. ASTM C1315 - Liquid Membrane-Forming Compounds, having Special Properties for Curing and Sealing Concrete
5. South Coast Air Quality Management District, Rule 1113 – Architectural Coatings (in effect on January 1, 2004).

1.4 SUBMITTALS

A. Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties, material compositions, and application instructions for all finishing products to be applied hereunder.
   a. Include certification of data indicating Volatile Organic Compound (VOC) content of all coatings.
2. Samples of each level of slip resistance, aggregate, and pattern available in the specified products from the proposed manufacturer.

1.5 QUALITY ASSURANCE

A. Use an applicator approved by the manufacturer, experienced in the approved materials, and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.6 ENVIRONMENTAL CONDITIONS

A. Work shall be done only under optimum conditions as recommended by manufacturer. Surfaces over which sealer is to be applied shall be completely dry (minimum 30 days since concrete placement) and thoroughly clean. Maximum moisture content is 8 percent.

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B. Minimum ambient and surface temperature for application shall be 45°F (7.2°C) during application, and for a minimum of 24 hours after application

1.7 PRODUCT HANDLING

A. Deliver materials to the job site and store in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Conren Limited, Product: "Lapidolith".

B. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering similar products include the following:
1. Conren Limited, Wrexham, England, http://www.conren.com
2. ChemRex, (A Sonneborne Company) Shakopee, MN.
3. Dayton-Superior, Miamisburg, OH, product "Ultra Seal 30 EF".
4. Nox-Crete Inc., Omaha, NE, product "Cure & Seal 100E".
5. W.R. Meadows, Inc., Hampshire, IL, product "DECRA-SEAL W/B".

2.2 MATERIALS

A. Transparent non-yellowing magnesium- flurosilicate concrete hardener and dust-proofer that bonds chemically with the concrete. Subject to compliance with the requirements specified herein, and consisting of the following performance criteria:

B. Chemical Resistance: ACI Standard 302.1R-89 magnesium fluorosilicate hardeners can be used to increase concrete resistance to chemicals including, but not limited to the following:
1. Aluminum sulfate
2. Ammonium chloride
3. Barium hydroxide
4. Beef fat
5. Calcium hydroxide
6. Calcium nitrate
7. Carbon dioxide
8. Carbonic acid
9. Castor oil
10. Coal-tar oils
11. Cottonseed oil
12. Creosote
13. Cresol
14. Distillers slop
15. Ethylene glycol
16. Ferric chloride
17. Ferric sulfate
18. Ferrous chloride
19. Ferrous sulfate
20. Fish oil
21. Fruit juices
22. Glucose
23. Glycerine

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24. Hydrogen sulfide
25. Iodine
26. Lactic acid, 25%
27. Lead refining solutions, 10%
28. Lignite oils
29. Machine oils
30. Magnesium chloride
31. Magnesium sulfate
32. Manganese sulfate
33. Manure
34. Mash, fermenting
35. Mercuric chloride
36. Mercurous chloride
37. Mine water, waste
38. Mineral oil
39. Molasses
40. Mustard oil
41. Nickel sulfate
42. Oleic acid,
43. 100%
44. Olive oil
45. Paraffin
46. Phenol, 25%
47. Phosphoric acid, 85%
48. Pickling brine, 10%
49. Poppy seed oil
50. Potassium aluminum sulfate, 10%
51. Potassium carbonate
52. Potassium chloride
53. Potassium dichromate
54. Potassium persulfate
55. Potassium sulfate
56. Rapeseed oil
57. Sea water
58. Silage
59. Sodium bromide
60. Sodium carbonate
61. Sodium chloride
62. Sodium dichromate
63. Sodium nitrite
64. Sodium sulfate, 10%
65. Sodium sulfite,10%
66. Sodium thiosulfate
67. Soybean oil
68. Sugar
69. Sulfite liquor
70. Tallow and tallow oil
71. Tannic acid
72. Tanning liquor, 10%

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73. Tobacco
74. Walnut oil
75. Zinc chloride
76. Zinc sulfate
77. Zinc nitrate
78. Zinc sulfate

C. Color: Milky white liquid that dries clear.

D. VOC: Actual VOC = 95 g/L. Compliant with all Canadian and U.S. VOC regulations for sealers including Federal EPA, OTC, LADCO, SCAQMD and CARB.

E. Estimating Guide: 200 - 300 sq. ft./gallon (4.9-7.4 sq m/L) per application, 2 applications recommended.

F. Primer/bonding agent: As recommended by sealer manufacturer.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Upon acceptance of completed existing surfaces, thoroughly remove all dust and debris by sweeping or vacuum cleaning.

B. Remove laitance, curing sealers, existing adhesives and other foreign matter from concrete surfaces with necessary techniques such as shot blasting, Muriatic acid etching, surface freezing and power scarification.

C. Surface preparation required if a curing compound has been applied to substrate surfaces.
1. Thoroughly etch concrete surfaces using well mixed solution consisting of two parts by volume water diluted with one part by volume 30 percent commercial grade hydrochloric acid at a rate of one quart per ten square feet. Apply evenly to thoroughly saturated areas and scrub into surfaces using stiff-bristled broom. Allow solution to activate undisturbed for not less than five minutes or for duration of boiling effect.
2. Thoroughly remove etching solution by washing down surfaces with clean water; flooded at least three separate times at a rate of two gallons per ten square feet; thoroughly remove all contaminates that may be engrained or latent in surfaces.
3. Perform a test application of a square foot in three locations, such as beneath casework. Allow to set for 72 hours, and test adhesion as recommended by the manufacturer.

3.2 APPLICATION

A. Apply sealer with manufacturer's recommended sprayer, at recommended rate of 400 square feet per gallon. Apply second coat when sealer is dry to touch. Allow sealer to cure undisturbed for a minimum period of 6 hours. Maintain temperature at 60 degrees Fahrenheit minimum until floor surfacing has completely dry.

END OF SECTION

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SECTION 033300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all labor, materials, equipment, services and transportation; and perform all operations necessary to:

1. Design and provide formwork for all concrete work on the project including all site development and utilities outside the building.
2. Furnish and place all concrete reinforcing steel and welded wire fabric.
3. Complete all concrete work as shown on the drawings, as specified herein, or both.
4. Install anchor bolts, inserts, cast-in plates and other hardware furnished under other Sections for attachment to concrete.
5. Compacted sand.
6. Steel dowels.

B. Provide all labor, materials, equipment, services and transportation and perform all operations necessary to provide all concrete work on the project including concrete required for housekeeping pads, inertia blocks, and foundations for mechanical, plumbing, and electrical equipment, site development and utilities outside the building. Work includes, but is not limited to:

1. Design, fabricate, furnish, and erect all concrete formwork for concrete work, include all shoring, reshoring and subsequent removal of forms.
2. Provide reinforcing steel and positioning and securing accessories.
3. Furnish, place, finish, cure, and protect plain and reinforced cast-in-place concrete above and below grade, as shown on the drawings. Provide all admixtures, concrete surface conditioners, threaded inserts, pre-mold joint fillers, dovetail anchor slots, water stops, and similar items in conjunction with concrete work.
4. Provide non-shrink cement grout under leveling, base, and bearing plates.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 055000 - METAL FABRICATIONS: Light iron and other miscellaneous metal work.

C. Section 072600 - VAPOR RETARDERS: Sheet membrane vapor barriers (vapor retarders) under concrete slabs-on-grade.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES.

1. ACI 211 - Proportions for Normal, Heavyweight, and Mass Concrete.
2. ACI 247 - Recommended Practice for Concrete Formwork.
3. ACI 301 - Structural Concrete for Buildings.
4. ACI 302 - Guide for Concrete Floor and Slab Construction.
5. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
6. ACI 305R - Hot Weather Concreting.

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7. ACI 306R - Cold Weather Concreting.
8. ACI 308 - Standard Practice for Curing Concrete.
9. ACI 309.2R - Identification and Control of Consolidation-Related Surface Defects in Formed Concrete.
10. ACI 315 - Details and Detailing of Concrete Reinforcement.
11. ACI 318 - Building Code Requirements for Structural Concrete.
12. ACI SP-66 - Detailing Manual.
13. ANSI/ASTM A 185 - Welded Steel Wire Fabric for Concrete Reinforcement.
14. ASTM A 615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
15. ASTM A 775 - Epoxy-Coated Reinforcing Steel Bars.
16. ASTM C 33 - Concrete Aggregates.
17. ASTM C 94 - Ready-Mixed Concrete.
18. ASTM C 150 - Portland Cement.
19. ASTM C 171 - Sheet Materials for Curing Concrete.
20. ASTM C 260 - Air Entraining Admixtures for Concrete.
21. ASTM C 309 - Liquid Membrane-Forming Compounds for Curing Concrete.
22. ASTM C 330 - Light Weight Aggregates For Structural Concrete.
23. ASTM C 494 - Chemicals Admixtures for Concrete.
24. ANSI/ASTM D 1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
25. ASTM D 2103 - Polyethylene Film and Sheeting.
26. ASTM D 3963 - Epoxy-Coated Reinforcing Steel.
27. AWS D 1.4 - Structural Welding Code for Reinforcing Steel.
28. CRSI - Manual of Practice.
29. PCA Publication - "Design and Control of Concrete Mixtures”.
30. PCA Publication - "Construction Joints" (AC 19.3)
31. PCA Publication - "Curing Concrete" (ST95)
32. PCA Publication - "Specification for Vibrating Concrete" (ST26)
33. U.S. Department of Commerce Simplified Practice Recommendation R-16, for sizes and use classifications of lumber; and Product Standard (PS):
    a. PS-1 - Construction and Industrial Plywood Standard.
    b. PS-20 - American Softwood Lumber Standard.
34. All applicable federal, state and municipal codes, laws and regulations for structural concrete

1.4 SUBMITTALS

A. Submit the following:

1. Literature: Manufacturer’s complete product data specifications, clearing stating product compatibilities and limitations, for portland cement, each admixture proposed to be used.
2. Shop drawings: Reinforcement Drawings: Prepare in accordance with ACI 315, “Details and Detailing of Concrete Reinforcement”.

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3. Certifications: Steel reinforcement: Mill test report of reinforcement materials analysis.

1.5 QUALITY ASSURANCE

A. Perform work to secure for the entire job homogeneous concrete having the required strength, durability and weathering resistance without planes of weakness and other structural defects, and free of pronounced honeycombs, air pockets, voids, projections, offsets of plane and other defacements on exposed surfaces.

B. Design reinforcement under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Maine.

C. Acquire cement and aggregate from same source for all work.

D. Welding: Qualify welding processes and welding operators in accordance with American Welding Society Code "Standard Qualification Procedures".

1.6 QUALIFICATIONS

A. Welders: Employ only experienced welders who are certified for the specific weld processes and positions required and who have been qualified within the preceding 12 months under AWS standard qualification procedure for the type of work required.

1.7 DELIVERY, STORAGE AND HANDLING

A. Store forms off ground in ventilated and protected manner to prevent deterioration from moisture.

B. Deliver void forms and installation instructions in manufacturer's packaging.

1.8 ENVIRONMENTAL CONDITIONS

A. Cold weather mixing and delivery:

1. Heat mix water, or aggregate, or both, when required to maintain specified concrete temperature. Use accepted methods that will preclude fluctuations in the concrete temperature, or flash set in the cement.

2. Do not heat aggregates higher than a spot temperature of 200 Degrees F., or higher than an average of 150 Degrees F. Add heated materials to the batch prior to the introduction of Portland cement. Do not use materials containing ice or frozen lumps.

3. Provide the following minimum concrete temperatures, in Degrees F., at the time mixing is complete:

Air temperature, Degrees F.	Section size less than 1 foot	Section size 1 to 3 feet	Section size 3 to 6 feet	Section size over 6 feet
Above 40	60	55	50	45
From 0 to 40	65	60	55	50
Below 0	70	65	60	55

B. Hot weather mixing and delivery:

1. Hold mixing of transit mix time to 45 minutes. Additional mixing shall be at the rated agitation speed.

2. Minimize the period of time between mixing and delivery. Discharge concrete into the formwork within 90 minutes after the cement comes in contact with water, aggregate, or both. Coordinate dispatching of trucks with actual field concrete placement rates to avoid prolonged waiting times.

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3. When ambient temperature is expected to be above 70 Degrees F., take appropriate safeguards to limit the temperature of the concrete to 80 Degrees F. at the time of placement in the formwork.

PART 2 - PRODUCTS

2.1 CONCRETE MIX

A. Concrete materials:

1. Cement conforming to ASTM C 150, Type II - Normal.
2. Fly ash: ASTM C 618 with the following modifications to Table 1, Chemical Requirements:
   a. Loss on ignition is limited to 3 percent, maximum.
   b. Sulfur trioxide (SO_3) is limited to 4.0 percent, maximum.
3. Fine aggregates conforming to ASTM C 33; natural sand. Limit content of coal and lignite to 0.5 per cent by volume.
4. Coarse aggregates conforming to ASTM C 33; Class 4S, crushed stone or gravel.
5. Water: Potable and complying with ASTM C 94.

B. Mix concrete and deliver in accordance with ASTM C 94; ready mixed concrete.

1. Ensure that concrete is completely discharged at the site within 1-1/2 hours after the introduction of the cement to the aggregates. In hot weather reduce this time limit so that no stiffening of the concrete shall occur until after it has been placed.
2. Begin the mixing operation within 30 minutes after the cement has been intermingled with the aggregates.

C. Select proportions for normal weight concrete in accordance with ASTM C94, meeting the following Criteria:

1. Minimum compressive strength: 28 day strength: 4,000 psi.
2. Aggregate size: 3/4 inches maximum.
3. Water/cement or water/cement plus fly ash ratio: 0.45 maximum.
4. Air Entrainment, plus 2 per cent, minus 1 per cent:
   a. 5 percent of volume minimum for exterior work.
   b. 3 percent of volume maximum for interior work.
5. Maximum slump: Provide high range water reducer at the concrete plant to provide the following at point of placement:
   a. Horizontal work: 5 inches, plus or minus 1 1/2 inches.
   b. Ramps: 3 inches, plus or minus 1 1/2 inches.

2.2 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

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2.3 STEEL REINFORCEMENT MATERIALS

A. Reinforcing steel: ASTM A 615, 60 ksi yield grade; deformed billet steel, unfinished, of sizes shown on the drawings.

B. Welded Steel Wire Fabric conforming to ASTM A 185 welded wire fabric; in flat sheets, unfinished, of sizes shown on the drawings.

C. Tie wire, minimum 16 gage annealed type, epoxy coated.

D. Steel dowels: Grade 259 steel dowels shall be level and parallel to with each other, extending 12 inches (300 mm) into adjacent concrete.

E. Chairs, bolsters, bar supports, spacers: adjacent to weather exposed to concrete surfaces, plastic coated steel type; preformed to size and shape as required.

1. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Stainless steel type; size and shape as required.

2.4 FORMWORK

A. For unexposed planar surfaces use APA graded B-B PLYFORM CLASS 1 EXT, Grade (Concrete Form) Plywood, minimum 3/4 inch thick, or undressed lumber, No. 2 common or better. Before reusing forms, withdraw nails and thoroughly clean surfaces to be in contact with concrete.

B. For exposed to view planar surfaces, use APA graded HIGH DENSITY OVERLAY PLYFORM CLASS 1 EXT (Concrete Form) Plywood, not less than 5 ply nor less than 5/8 inch thick, complying with Voluntary Product Standard PS1 for Construction and Industrial Plywood, with Group 1 species plies.

2.5 ACCESSORIES

A. Form ties:

1. For securing forms where surfaces will be exposed in the finished work: Use tie screws with removable plastic cones, removable bolts, special removable tie wires or type 302/304 stainless steel snap ties.

2. For securing forms where surfaces will not be exposed: Use either bolts or wires. Use ties of such type that when forms are removed, no metal is closer than 1-1/2 inches from the finished concrete surface.

B. Non-shrink grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5000 pounds per square inch in 48 hours and 10,000 pounds per square inch in 28 days, equal to one of the following:

1. Symons Corporation, Des Plains IL, product " Multi-Purpose Construction Grout".

C. Bonding agent: Two component, epoxy resin adhesive system conforming to ASTM C 881, Type I and II, Grade 2, Class C, equal to Sonneborn Building Products: "Sonobond". Other manufacturers offering similar products which may be considered as equal include the following:

1. L & M Construction Chemicals, Inc., Omaha NB.

2. W.R. Bonsal Company, Charlotte, NC.

D. Universal form release agent: Mineral oil or chemically neutral, water insoluble commercial form release agent, containing no waxes or silicones and low sulphur content equal to one of the following:

1. Nox-crete Inc., Omaha NE, product "Nox-crete formcoating".

2. Symons Corporation, Des Plains IL, product " Magic Kote".

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3. Thompson & Formby Inc. Olive Branch, MS, product “Thompson’s CB”.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare existing concrete with steel brush cleaning, remove all loose and chipped existing concrete and applying bonding agent in accordance with manufacturer's instructions.

B. In locations where concrete is dowelled into existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Place, tie and support reinforcing to maintain proper spacing and equal concrete coverage, secure reinforcement against displacement.

3.2 FORMWORK ERECTION

A. General: Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements, and in accordance with ACI 301.

1. Forms shall conform to the lines, dimensions and shapes of concrete shown providing for openings, recesses, keys, slots, beam pockets and projection as required.

2. Make forms clean and free of foreign material before placing concrete.

3. Do not use earth cuts as forms for vertical surfaces, unless approved by the Architect/Engineer at specific locations.

4. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

5. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to over stressing by construction loads.

6. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

7. Align joints and make watertight. Keep form joints to a minimum.

8. Obtain approval before framing openings in structural members which are not indicated on Drawings.

B. Design of Formwork: Comply with ACI 301, Chapter 4.

1. Form rods and tie wires of exterior surfaces shall slope down from the inside to outside of forms.

2. Provide forms so that no discernible imperfection in evidence in finished concrete surfaces due to deformation, bulging, jointing, or leakage of forms.

C. Application of form release agents: Comply with ACI 301, Chapter 4.

1. Apply form release agent on formwork in accordance with manufacturer’s recommendations. Use non-staining mineral oil or form lacquer

2. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

3. Do not apply form release agent where concrete surfaces will receive [special finishes] [or] [applied coverings] which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

D. Form cleaning:

1. Clean forms as erection proceeds, to remove foreign matter within forms.

2. Clean formed cavities of debris prior to placing concrete.

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3. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.3 REINFORCEMENT

A. Ensure that vapor barrier is installed prior to placing reinforcement for slabs-on-grade.

B. General: Comply with ACI 301, Chapter 5.

C. Placing tolerances: Comply with ACI 301, Chapter 5.

D. Placing:

1. Comply with ACI 301, Chapter 5. Splicing shall conform to ACI 318, when splices which are not shown on the Drawings, are approved by the Architect.

2. Place reinforcing bars having assigned positions so that distinguishing marks agree with those given on the shop drawings relating to or calling for the bars.

3. Secure all reinforcing bars in place with high-density plastic supporting and spacing devices and metal tying devices. Reinforcing in concrete members that have one or more surfaces exposed, whether painted or unpainted finish, shall be tied with 14 gage soft annealed wire.

E. Minimum reinforcement: Where no other reinforcement is shown for concrete fill or toppings, provide 6 by 6 inch, W2.9 x W2.9 welded wire fabric.

3.4 CONCRETE PLACEMENT

A. Place concrete in conformance to ACI 301; place continuously between predetermined expansion, control, and construction joints Do not interrupt successive placement, do not permit cold joints to occur.

1. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

2. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

B. Vibrate concrete during deposition with internal type, high frequency mechanical vibrator having a speed of not less than 7000 revolutions per minute. Do not use vibrators to move concrete. Supplement all vibration by wooden spade muddling between reinforcing and forms, and into corners.

C. Separate slabs on grade from vertical surfaces with joint filler.

D. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.

3.5 FINISHING

A. General Requirements for flatwork:

1. Set edge forms and intermediate screed strips accurately and sufficiently rigid to support screeds and so that proper surface elevations and concrete thicknesses are achieved allowing for dead load deflection and camber of formwork.

2. Take measurements and control tolerances by the use of transit instrument.

3. Upon completion of leveling, remove screeds and fill spaces with concrete.

4. Underfinish microsilica concrete by limiting finishing operation to screeding, bull-float, and broom finish. Curing shall be initiated within one hour of concrete placement.

B. Steel trowel: Level surface and remove excess laitance by tamping, screeding, and preliminary wood floating. When the slab has hardened sufficiently so that water and fine material will not be worked to the top, compact the surface with motor-driven floats of the

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disc type and trowel smooth with two steel troweling operations. Do the second troweling after the concrete has become so hard that no mortar will adhere to the edge of the trowel, and exert heavy pressure to thoroughly compact the surface. Leave floors with a smooth, hard finish free of blemishes and true to tolerance specified. Steel trowel finish surfaces scheduled to receive the following:

1. Resilient flooring.
2. Adhesive set, thin set, and medium set ceramic tile.
3. Carpeting.
4. Where no other finish is specified.

C. Motor Float Finish: Level surface and remove excess laitance by tamping, screeding, and preliminary wood floating. When the slab has hardened sufficiently so that water and fine material will not be worked to the top, compact the surface with motor-driven floats of the disc type. Leave floors with a smooth finish and true within specified tolerances. Motor float finish surfaces scheduled to receive the following:

1. Membrane waterproofing.
2. Floor topping.

D. Broom Finish: Tamp the concrete using special tools to force aggregate away from the surface, then screed with straightedges to bring surfaces to the required lines. While the concrete is still green, wood float to a true and uniform plane with no coarse aggregate visible, and apply a broomed finish, in the direction indicated. Broom finish where indicated on the contract drawings.

3.6 FORM REMOVAL

A. Remove forms when concrete has gained sufficient strength to carry its own weight and imposed loads.

1. Do not disturb forms for framing until the concrete has attained at least 40 percent of design strength for side forms and 80 percent of strength for bottom forms, or reshore as required. Be responsible for proper form removal and replace any work damaged due to inadequate maintenance or improper or premature form removal.

B. Where use of metal form ties extending to within less than 1-1/2 inch of the face of permanently exposed concrete has been unavoidable, cut off such ties at least 1-1/2 inch deep in the concrete, but not less than 72 hours after concrete has been cast. Remove forms by methods which will not spall the concrete or cause any injury whatsoever. Hammering or prying against concrete will not be permitted.

3.7 TOLERANCES

A. Maximum variation of surface flatness for exposed concrete floors 1/4 inch in 10 feet.

B. Maximum variation of surface flatness under seamless resilient flooring: 1/8 inch in 10 feet.

C. Maximum variation of surface flatness under carpeting 1/4 inch in 10 feet.

D. Maximum variation for wood float finish: 3/8 inch in 10 feet.

E. Correct defects in the defined traffic floor by grinding or removal and replacement of the defective work. Areas requiring corrective work will be identified. Remeasure corrected areas by the same process.

3.8 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

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C. Ponding: Maintain 100 percent coverage of water over floor slab areas continuously for 4 days.

D. Spraying: Spray water over floor slab areas and maintain wet for 7 days.

3.9 DUSTPROOFING

A. Apply 2 coats of dustproofer, in accordance with the approved manufacturer's instructions, in the following concrete surfaces:

1. Exposed finish.

2. To receive carpeting.

3.10 GROUTING

A. Mix grout in accordance with the approved manufacturer's instructions to a consistency which will permit placement. Place grout so as to ensure complete bearing and elimination of air pockets.

3.11 Field Quality Control

A. Field inspection and testing will be performed in accordance with the provisions of ACI 301 Chapter 3, by a design laboratory acceptable to the Architect/Engineer. Bear all costs in connection with these tests and for the design of concrete mixes.

1. Ready-mix concrete: Accompany each load of arriving at the job with ticket which shall be subject to checking testing laboratory at the plant and which contain the following information

a. The strength of the mix of concrete being delivered.

b. The exact time the cement and aggregate were discharged into the delivery truck. If upon reaching the job the concrete cannot be placed within the time limits stated, or if the type of concrete delivered is incorrect, the inspector will reject the load for use, and it shall be removed from the site at the Contractor's expense.

c. List of admixtures.

B. Provide free access to Work and cooperate with appointed firm.

3.12 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections in accordance with ACI 301, or as otherwise directed.

3.13 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Architect/Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

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SECTION 035416

CEMENT-BASED UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes cement-based, polymer-modified, self-leveling underlayment for interior finish flooring.

1. Provide as leveler at existing floor substrates that are not flat and level.

B. Furnish and install perimeter joint filler.

1.2 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ACI 302 - Guide for Concrete Floor and Slab Construction.
2. ASTM C150 - Portland Cement.
3. ASTM C 1708 - Self-leveling Mortars Containing Hydraulic Cements.

1.3 SUBMITTALS

A. Submit the following under provisions of Section 010000 – ADMINISTRATIVE REQUIREMENTS:

1. Literature:
   a. Manufacturer’s complete product data specifications, methods of mix design.
   b. Manufacturer’s complete product data for admixtures proposed to be used, curing compounds, and other manufactured items.
2. Manufacturer’s installation instructions: Indicate product installation criteria, environmental and curing requirements.

1.4 QUALITY ASSURANCE

A. Mixing and application equipment as approved by the manufacturer.

B. Installer Qualifications: An experienced installer (applicator) who is acceptable to manufacturer, who has completed cement-based underlayment applications similar in material and extent to that required for this Project, and whose work has resulted in construction with a record of successful in-service performance.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original undamaged packages or acceptable bulk containers.

B. Store materials inside, under cover, and in manner to keep them dry, protected from weather, freezing temperatures, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.

C. Do not use underlayment materials which show indications of moisture damage, caking, or other signs of deterioration.

1.6 ENVIRONMENTAL CONDITIONS

A. Do not place cementitious underlayment when ambient temperature is below freezing.

B. Environmental Requirements: Before, during and after installation of Level-Right, building interior shall be enclosed and maintained at a temperature above 50 degrees F (10 degrees

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C) and below 100 degrees F (37.7 degrees C) until structure and subfloor temperature are stabilized.

C. Do not place underlayment on surfaces which are covered with standing water, snow, or ice.

1.7 COORDINATION

A. Coordinate cement-based underlayment with requirements of finish flooring products, including adhesives, specified in Division 9 Sections.

1. Before installing surface sealers recommended by underlayment manufacturer, if any, verify compatibility with finish flooring installation adhesives.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Maxxon Corporation, Hamel, MN, http://www.maxxon.com. Product: “LevelRight”.

B. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Underlayment manufacturers and products:

a. Maxxon Corporation, product “LevelRight”.

b. Ardex, Inc., product “Ardex K-15”.

c. Quikrete Company, product “Self-Leveling Floor Resurfacer”, number 1249-50.

2.2 CEMENTITIOUS UNDERLAYMENT

A. Underlayment: Cementitious, self-leveling product that can be applied in uniform thicknesses from 0 inch – 3 inch (0 - 76 mm) that can be feathered at edges to match adjacent floor elevations.

B. Characteristics:

1. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
2. Compressive Strength, when tested according to ASTM C 109/C 109M:
   a. 3,000 psi (20.6 MPa) (3 days).
   b. 4,500 psi (31 MPa) (7 days).
   c. 5,500 psi (38 MPa) (28 days).
3. Flexural Strength: 1260 psi (8.7 MPa) (28 days) (ASTM C 348).
4. Dry Density: Approx. 125 lbs./ft³ (2,003 kg/m³).
5. Tensile Strength: 720 psi (5 MPa) (28 days) (ASTM C 190)
6. Surface Burning Characteristics:
   a. Flame Spread – 0.
      Fuel Contribution – 0.
      Smoke Development - 0 (ASTM E 84).
7. GREENGUARD and GREENGUARD Gold Certified.

C. Accessories:

1. Primer: As recommended by underlayment manufacturer for intended substrate.

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2. Sand aggregate: Well graded, washed gravel (1/8 inch to 1/4 inch or larger) for use when underlayment installed thickness shall be greater than 1-1/2 inch thick.
   a. Sand aggregate shall be equal to “Level-Right Sand Specification 101”.
3. Water: Clean potable and cooler than 70 degrees Fahrenheit.
   a. Use minimum amount of water necessary to produce a workable mix.
   b. Use minimum amount of water necessary to produce a workable mix.
4. Sealer: Shall be equal to “Maxxon Overspray”.
5. Perimeter Joint Filler: Glass fiber strips, compressible to 50 percent original thickness under load of 25 pounds per square inch with full recovery. Conforming to ASTM C612, Class 2

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of underlayment including substrate moisture content. Begin underlayment application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Concrete substrates: Prepare existing concrete with steel brush cleaning, remove all loose and chipped existing concrete and applying bonding agent (primer) in accordance with manufacturer's instructions.
   1. Surfaces to receive underlayment shall be free of sealers, dirt, oil, grease, or other contaminants.
   2. Unless substrate or other surface preparation method is approved by manufacturer, surface shall be shotblasted prior to application of bonding agent (primer).

B. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond according to manufacturer's written instructions.

C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

D. Control Joints: Install control joints at junctures with vertical surfaces, including curbs, walls, and vents, for full depth of underlayment.

E. Install expansion joint filler at:
   1. Perimeter of decking.
   2. Around penetrations through deck.

3.3 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.
   1. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
   2. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface. Sloping of 1/8 inch in 10’-0” maximum is permitted to produce level surface.
   1. Apply a final layer without aggregate if required to produce smooth surface.

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2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install finish flooring over underlayment until after time period recommended by underlayment manufacturer.

F. Remove and replace underlayment areas that evidence

3.4 FIELD QUALITY CONTROL

A. Slump Test: If slump testing is recommended in writing by manufacturer, test underlayment for slump as it is placed for compliance with manufacturer's written recommendations.

B. Field Samples: Take at least three molded-cube samples from each underlayment batch. Test samples according to ASTM C 109/C 109M for compliance with compressive-strength requirements. When requested, provide test results to Architect

3.5 DEFECTIVE UNDERLAYMENT

A. Defective Underlayment: Underlayment not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Refinish or remove and replace underlayment surfaces which are too rough to receive finish roofing or where physical properties do not meet specified requirements, as determined by Architect.

C. Repair or replacement of defective underlayment will be determined by the Architect.

3.6 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

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SECTION 055000

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this Section consists of miscellaneous metals, and ornamental iron where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.

B. Furnish and install:

1. Above ceiling supports, and other similar products furnished under other sections, including but not limited to angles, plates and fasteners.
2. Supplemental soffit support framing.
3. Universal grid system.

C. Perform all drilling and cutting in miscellaneous metal items required for the attachment of other items.

D. Remove hardware and fittings from existing metal framing, and patch with metal paste filler.

E. Perform all shop-painting for all surfaces of exposed to view galvanized and non-galvanized metals, and post-erection touch-up of shop prime coat, using the same material as shop-prime coating.

F. Perform application of liquid zinc touch-up to all welds of galvanized steel items furnished hereunder.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 061000 - ROUGH CARPENTRY: Wood blocking.

E. Section 064000 - ARCHITECTURAL WOODWORK: Countertops requiring fabricated steel supports.

F. Section 08800 - GLAZING: Requirements for tempered glazing as part of the glass railing system specified herein.

G. Section 092216 - NON-STRUCTURAL METAL FRAMING: Non-loadbearing metal framing systems for interior partitions and ceilings.

H. Section 099100 - PAINTING: Applied finish coatings other than those specified herein.

1.3 REFERENCES

A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.

1. ASTM A 36 - Structural Steel.

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2. ASTM A 53 – Pipe, Steel, Black and Hot-Dipped, Zinc-coated, Welded and Seamless Steel Pipe.
3. ASTM A 108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
4. ASTM A 123 - Zinc Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.
5. ASTM A 153 - Zinc-Coating on Iron and Steel Hardware.
6. ASTM A 283 - Carbon Steel Plates, Shapes, and Bars.
7. ASTM A 307 - Carbon Steel Externally Threaded Standard Fasteners.
8. ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
9. ASTM A 361 - Zinc Coated (Galvanized) Iron or Steel Roofing sheets.
10. ASTM A 385 – Providing High Quality Zinc Coatings.
11. ASTM A 386 - Zinc Coating on Assembled Steel Products.
12. ASTM A 446 - Zinc Coated (Galvanized) Steel Sheets of Structural Quality, Coils and Cut Lengths.
13. ASTM A 501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
14. ASTM A 525 - Specification for Sheet Steel, Zinc Coated (Galvanized).
15. ASTM A 780 – Repair of Hot-Dip Galvanizing.
16. ASTM A1011/A1011M - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
17. ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus.
18. ASTM A 575 Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
19. ASTM A576 Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
20. ASTM F 593 - Stainless Steel Bolts, Hex Cap Screws.
21. ASTM F 594 - Stainless Steel Nuts.
22. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
23. AGAI - Inspection Manual for Hot-Dipped Galvanized Products.
24. AISC - Code of Standard Practice for Steel Buildings and Bridges.
25. AISC - Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
26. AISI. referenced standards.
27. AWS - Standard Code for Arc and Gas Welding in Building Construction.
28. IPA (Industrial Perforators Association) - Voluntary Standard Tolerances.
29. MIL-P-21035B - Paint High Zinc Dust Content, Galvanizing Repair (Metric) (superseding DOD-P-21035A)
30. NAAMM, applicable publications.
31. SSPC referenced standards.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate work of this Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

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2. Be responsible for establishing locations and levels for all work of this Section, except such parts as may be delivered to others and set by them. In such cases assist them in properly locating said parts.

B. Pre-Installation Meetings: At least two weeks prior to commencing fabrication work of this Section, conduct a pre-installation conference at the Project site. Comply with requirements of Section 013000 – ADMINISTRATIVE REQUIREMENTS. Coordinate time of meeting to occur prior to installation of work under the related sections named below.

1. Required attendees: Owner's Project Manager (OPM), Architect, Contractor, Installer's Project Superintendent, and representatives of other related trades as directed by the OPM, Architect or Contractor.
2. Agenda:
   a. Scheduling of metal fabrications operations.
   b. Review of staging and material storage locations.
   c. Coordination of work by other trades.
   d. Installation procedures for ancillary equipment.
   e. Protection of completed Work.

C. Sequencing:

1. Field Measurements:
   a. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.
   b. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.

D. Scheduling:Coordinate the work of this Section with the respective trades responsible for installing inserts and anchorages furnished by this Section; make arrangements for delivery, receipt and installation of inserts and anchorages to prevent delay of the Work.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's complete product data and specifications for all prefabricated items, shop primer paints, liquid zinc coating, and hydraulic cements, to be furnished hereunder.
   a. For epoxy anchoring systems: Furnish ICC-ES Code approvals and performance data that includes recommended loading for each application.
   b. Include large scale details of items of all metal fabrications to be furnished hereunder, showing proposed methods of anchorage to surrounding structure and conditions.
   c. Include large scale details of metal fabrications supporting work of other trades.
2. Shop Drawings, bearing registration stamp of a Professional Structural Engineer registered in the State of Maine.
   a. General requirements:
      1) Include large scale details of items of all metal fabrications to be furnished hereunder, showing proposed methods of anchorage to surrounding structure and conditions.
      2) Indicate on the shop drawings all erection marks for various places of miscellaneous metals, and ensure that the actual field pieces bear corresponding marks.
      3) Indicate shop built components, and field-built components.
      4) Indicate and detail all field installation connections.
      5) Indicate weld types and length.
      6) Indicate blocking locations.

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3. Selection Samples: Sample card indicating Manufacturer's full range of colors of shop applied finishes available for selection by the Architect.
4. Verification Samples:
   a. Factory/shop finishes: 3 inch by 6 inch samples of factory-applied coatings and colors proposed for use for approval prior to coating application.
   b. Provide minimum 24 by 24 inch (or equivalent for shapes) of fabricated and finished ornamental metal components, demonstrating the quality of fabrication work, and finish.
5. Certificates:
   a. Certificate of Compliance from Galvanizer: Submit notarized Certificate of Compliance with application for payment for galvanizing, signed by galvanizer, indicating compliance with requirements of specifications. Include scope of services provided, and quantity and itemized description of items processed.
   b. Welders certificates as specified under Article entitled “QUALITY ASSURANCE”.
6. Delegated Design Submittals: Provide calculations for loading and stresses for the work of this section, bearing the Professional Structural Engineer’s seal. Show how design load requirements and other performance requirements as required by the State Building Code have been satisfied.
   a. Work scope requiring loading and stress calculations includes, but is not limited to the following:
      1) Metal fabrications supporting work of other trades.
      2) Overhead supports.

B. Closeout Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.
   1. Galvanizer’s tagging: The galvanizer shall mark all lots of material with a clearly visible stamp or tag indicating the name of the galvanizer, the weight of the zinc coating, and the applicable ASTM Specification Numbers.

B. Qualifications:
   1. Fabricator/Installer: Minimum of 5 years documented experience demonstrating previously successful work of the type specified herein, and approved by product manufacturer.
   2. Welders: Utilize only qualified welders employed on the Work. Submit verification that Welder’s are AWS D1.1 and D1.4 qualified within the previous 12 months.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Subcontract, have been received and approved by the Architect.

B. Storage and Handling Requirements:
   1. Handle and store materials under cover in a manner to prevent defacement, deformation, or other damage to the materials and to shop finishes, and to prevent the accumulation of foreign matter on the metal work. All such work shall be repaired and cleaned prior to erection.

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PART 2 - PRODUCTS

2.1 MATERIALS

A. General: All materials shall be new stock, free from defects impairing strength, durability or appearance, and of best commercial quality for each intended purpose. Unless specifically called for otherwise, work shall be fabricated from the following:

1. Steel shapes, plates and bars: ASTM Designation A 36.
2. Steel pipe: ASTM A53, grade A, seamless pipe, black finish unless otherwise noted.
3. Structural steel tubing, square and rectangular shapes: ASTM A500, Grade B.
4. Steel tubular shapes: ASTM A 501.
5. Steel plates to be bent or cold-formed: ASTM A283, grade C.
6. Steel bars and bar-size shapes: ASTM A36.
7. Cold-finished steel bars: ASTM A108.
8. Galvanized carbon steel sheets: ASTM A526, with G90 zinc coating in accordance with ASTM A525.
9. Gray iron castings: ASTM A48, class 30.
10. Malleable iron castings: ASTM A47,

B. Recycled content of Ferrous Metals: Use maximum available percentage of recycled steel. Steel incorporated into the work shall contain not less than 25 percent of recycled steel.

C. Steel materials: to be hot dip-galvanized: Provide steel chemically suitable for metal coatings complying with the following requirements: Carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.

D. Metal surfaces, general: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

2.2 UNIVERSAL GRID SYSTEM

A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Unistrut Corporation, Itasca, IL.

1. Acceptable Manufacturers and products: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following.
   a. Unistrut Corporation, Itasca IL., product “Unistrut”
   b. Cooper US, Inc., Houston, TX., product “Cooper B-Line”.
   c. Gleason Partners, LLC., Grand Rapids, MI., product “Strut Channel Systems”.
   d. Thomas & Betts Corporation, Memphis, TN, product “Kindorf Superstrut”.
2. There are no other manufacturers of this product type available in the United States, fabricators may choose to fabricate grid system components using structural steel shapes, with submittal and approval of complete engineering Drawings and calculations as a substitution.
3. Finish: Electrolytically zinc coated per ASTM B 633 Type III SC 1.

B. All channel members shall be fabricated from structural grade steel confirming to the following ASTM specifications:

1. ASTM A 653 Grade A

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C. All fittings shall be fabricated from steel conforming to one of the following ASTM specifications:
   1. ASTM A 36, A 575, or A 576.

D. All materials shall be stamped and identifiable by manufacturer and part number (where appropriate). Materials that appear damaged, distressed, unidentifiable or rusted shall not be used and will not be accepted.

2.3 FASTENERS

A. General: Provide all fasteners and attachments as required for work specified herein and as indicated on the Drawings.
   1. In general,
      a. Provide all fasteners and attachments of the same material and finish as the metal to which it is applied unless otherwise noted.
         1) Provide Type 304 stainless-steel fasteners for exterior use.
         2) Provide Type 304 stainless-steel fasteners for fastening aluminum.

B. Steel Bolts, Nuts and Washers: ASTM A307, galvanized to ASTM A153 for galvanized components.

C. Fasteners at blind structural tubes, or other blind conditions: Lindaptor North America, Ann Arbor, MI, product: “Type HB Hollo-Bolt”, or approved equal.
   1. Acceptable Manufacturers, or approved equal.
      a. Lindaptor North America, Ann Arbor, MI.
      b. Simplified Building Components, Rochester, NY.
      c. Avdel USA LLC., Stanfield, NC.
   2. Head type: Hexagonal.
   3. Material: Hot-dipped galvanized steel.

D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel type 304 bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.

E. Anchor Bolts: ASTM F 1554, Grade 36.
   1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

F. Eyebolts: ASTM A 489.

G. Machine Screws: ASME B18.6.3.

H. Lag Bolts: ASME B18.2.1.

I. Plain Washers: Round, ASME B18.22.1.

J. Lock Washers: Helical, spring type, ASME B18.21.1.

2.4 ACCESSORIES

A. Stainless steel post and glass railing system as detailed on the Drawings and manufactured by CR Laurence, www.crlaurence.com
   1. Basis of Design: CRL P-Series.
   2. All components to be brushed stainless steel.
   3. Handrails to be C.R. Laurence oval shaped, in diameter as selected by the Architect.

B. Adhesive for attaching anchors and for direct pinning: high-modulus, high strength, moisture tolerant, epoxy adhesive. two-component 100 percent solids, epoxy resin complying with ASTM C 881.

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1. Minimum performance properties (as cured at 70 degrees F. and 50 percent relative humidity):
   a. Minimum Compressive Strength, tested per ASTM D-695:
      1) at 3 days: 11300 psi (31.0 MPa).
      2) at 7 days: 11800 psi (44.8 MPa).
      3) at 28 days: 12200 psi (58.6 MPa).
   b. Shear Strength, tested per ASTM D-732 at 14 days: 6200 psi (43 MPa)
   c. Minimum Flexural Strength tested per ASTM D-790 at 14 days: 10700 psi (74 MPa).
   d. Minimum Bond Strength tested per ASTM C-882 at 14 days:
      1) Plastic Concrete to Hardened Concrete 2200 psi (13.8 Mpa).
      2) Plastic Concrete to Steel 2000 psi (13.8Mpa).
   e. Maximum Water Absorption, tested per ASTM D-570: 24 hour 0.27%
   f. Minimum Tensile properties tested per ASTM D-638: Tensile Strength 6900 psi (48 Mpa).
2. Products which may be considered as equal include the following, or approved equal:
   a. Sika Corporation, Lyndhurst, NJ., product: “Sikadur 32 Hi-Mod Gel.
   b. Simpson Strong Tie, Pleasanton, CA., product “SET High Strength Epoxy”.
   c. Symons Corporation, Des Plaines, IL., product “Rescon Gel anchor 304”.

C. Grout: Ready mixed, non-metallic high-strength controlled expansion grout of flowable consistency, conforming to ASTM C 1107 with minimum compressive strength of 8,000 pounds per square inch (55.2 MPa) at 28 days.
   1. Products which may be considered as equal include the following, or approved equal:
      a. Five Star Products, Inc., Fairfield, CT, product “Five Star Grout.”
      b. L&M Construction Chemicals, Omaha, NE, Product: “Crystex.”
      c. BASF Construction Chemicals, Cleveland, OH., product “Masterflow 713”.
      d. Sika Corporation, Lyndhurst, NJ., product “SikaGrout 212”.
      e. ChemMasters, Madison, OH., product “Conset”.

D. Metal paste filler: 2 component epoxy, high strength, structural adhesive putty:
   1. Products which may be considered as equal include the following, or approved equal:
      a. Abatron, Inc. Gilberts, IL, product: “Ferrobond-P”.
      b. Dynatron/Bondo Corp., Atlanta, GA, product: “Bondo Plastic Filler”.

E. Liquid zinc coating, for touch-up of welds, scratches, and abrasions in galvanized steel: Low VOC organic zinc-rich coating containing 92% metallic zinc, by weight in the dried film (ASTM D520, Type III) and conforming to SSPC Paint 20, Type II, Level 1. Liquid zinc coating shall be recognized under the Component Program of Underwriter's Laboratories, Inc. as an equivalent to hot-dip galvanizing; conforming to MIL-P-21035B and SSPC Paint 29, Type II, Level I, for repair of hot-dip galvanizing and meeting the requirements for Zinc-Rich Paints.
   1. VOC limit: not more than 250 g/L.
   2. Specified manufacturer and product: ZRC Worldwide, Marshfield MA, product “ZRC-221”.

F. Primer for non-galvanized steel surfaces, modified alkyd rust-inhibitive, high solids primer:
   1. Products which may be considered as equal include the following, or approved equal:
      a. International (Courtaulds Coatings): Interlac 260HS.
      b. Rust-Oleum: 1069 Heavy Duty Rust Inhibitive Red Primer.
      c. Sherwin Williams: Kem Flash Primer HS, Red Oxide E61R702.
      d. Tnemec: 10-99 Red Primer.
      e. Wibur & Williams (California Products Corporation): 1703 Universal Metal Primer.

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2.5 FABRICATION - GENERAL

A. Metal surfaces shall be clean and free from mill scale, flake, rust and rust pitting; well-formed and finished to shape and size, true to details with straight, sharp lines, and angles and smooth surfaces. Curved work shall be to true radii. Exposed sheared edges shall be eased.

B. Shop fabricate items wherever practicable, accurately fitting all parts and making all joints tight. Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Architect.

C. Do all cutting, punching, drilling, and tapping required for attachment of anchor bolts and other hardware and for attachment of work by other trades. All such work shall be done prior to hot-dip galvanizing of the various components.

D. Grind all edges of bars and plates completely free from nicks and machine marks, prior to galvanizing and/or shop priming.

E. Grind all exposed-to-view welds completely smooth and flush to the surface plane of the base metals. Perform welding work prior to galvanizing in all cases, except where field welding is necessary, in which case, completely coat all such welds with two coats of specified liquid zinc coating, after performing grinding operations.

F. Use screws and bolts only where welding cannot be performed, of sufficient size to ensure against loosening from normal usage of miscellaneous metal items furnished hereunder.

1. Countersink all screw heads and bolt heads as far as practicable. Use not less than two screw, bolts, or other anchorage items, at each connection point.
2. Draw up all threaded connections tightly, after buttering same with pipe joint compound, to exclude water.

G. Provision for Thermal Movement: 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. Design, fabricate and install for temperature change range of 120 degrees F, ambient temperature and 180 degrees F, material surfaces.

H. Carefully coordinate the installation of metal fabrications with the work of trades responsible for the installation of interfacing work, and for the installation of work into the various assemblies furnished hereunder, and permit the installation of the related materials to be made at the appropriate times.

I. Fit and assemble metal fabrications in largest practical sections for delivery to site, ready for installation.

1. Galvanized assemblies: Where size of assembly is too large for galvanizing kettle, galvanize components prior to fabrication and assemble after galvanizing.

2.6 FABRICATION - SUPPORTS

A. Fabricate support system to carry the entire load of supported products to building structure above without transferring any horizontal or vertical load to ceiling system(s). Provide frequently spaced holes for multiple adjustment. Provide diagonal bracing. Use of a “Universal Grid” system members is acceptable.

B. Fabricate supports for equipment, fixtures, and appurtenances utilizing a “Universal Grid” system with rails extending wall-to-wall, perpendicular to the path of travel of the same.

1. Design, engineer and fabricate supporting framework to support a concentrated load at any single point along the exposed rails, as exerted by the equipment to be purchased by the Owner.

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a. Installed framework shall have a minimum loading safety factor of 2.5, based upon ultimate strength under static loading conditions.
b. The concentrated load shall be the maximum that will be encountered by positioning the equipment at the extremities of its travel (maximal load configurations).
c. Base loads on the most severe conditions as may be encountered by any of the manufacturers producing equipment for the type of services of the rooms indicated.

2. Rail shall be on centers as required by equipment manufacturer and allow continuous attachment along any point on the rail.
3. System shall be true, plumb and level to the tolerances indicated, with no more than 1/720th of the span maximum deflection in either plane, when maximum loading conditions are applied due to equipment operations.

2.7 FINISHES - HOT-DIP GALVANIZING

A. Surface preparation prior to galvanizing: Pickle steel prior to galvanizing in conformance with SSPC-SP8. Remove all rust, dirt, weld flux, weld spatter, and other foreign matter.

B. Hot-Dip Galvanizing: For steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dip process.

1. Basis-of-Design: “Duncan Galvanizing, Everett, MA., product ”Duragalv.”
2. Comply with ASTM A 123 for fabricated products and ASTM A 153 for bolts, nuts, washers, and other rough hardware. Provide thickness of galvanizing specified in referenced standards.
3. Wherever possible, perform galvanizing after assembly of items.
4. Galvanized items shall be straightened to remove all warpage and distortion caused by the galvanization process.
5. Fill vent holes after galvanizing (if applicable), and grind smooth.
6. Touch-up all breaks on hot-dip surfaces caused by cutting, welding, drilling or undue abrasion with liquid zinc coating as specified herein above. Apply liquid zinc by brush or spray on all damaged areas in two coats to a total dry film thickness of not less than 3 mils. Apply first coat within two hours after damage to hot-dip film to prevent undue oxidation of exposed surface. On all welds remove weld spatter by power wire brushing or equivalent before applying liquid zinc coating. Repair material should extend at least 3 inches beyond all edges of the damaged galvanized area as possible to assure continuity of galvanic protection.
7. Touch-up of galvanized surfaces with aerosol spray, silver paint, bright paint, brite paint, or aluminum paints is not acceptable.

2.8 FINISHES - SHOP APPLIED COATINGS

A. Schedule: Shop applied coatings as scheduled at end of Section and as indicated on Drawings.

B. For non-galvanized steel surfaces:

1. Surface preparation prior to priming: Thoroughly clean all steel of all loose mill scale by power wire brushing or sandblasting. Remove all rust, dirt, weld flux, weld spatter, and other foreign matter by wire-brushing or scraping (power wire-brushing, if necessary). Grind smooth any sharp projections.
2. Shop apply specified primers thoroughly and evenly on the surfaces and worked into the joints and other open areas on the surfaces. Surfaces inaccessible after assembly shall be given two coats. Dry film thickness of primer shall be not less than 2.4 mils per coat.

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C. For hot rolled carbon steel (HRCS) fabrications and shapes exposed to view (interior only condition):
   1. Glass bead blast all fabrications clean to remove mill scale and other residue ensuring not damage or cutting of metal fabrications. Do not remove black layer of iron oxide from base metal.
   2. Treat cleaned metal with JAX steel blackener and apply two coats of matte Permalac lacquer and one coat of acid base free Renaissance Micro-Crystaline Wax

D. Hot rolled steel with clear powder coat finish:
   1. Preparation: sheets to be cleaned of remaining manufactured residue with ScotchBrite by hand or glass bead blasted (preferred technique), using soft round edge bead type. Do not cut surface with sand blasting techniques.
      a. during cleaning do not remove black layer of iron oxide as harder than base metal.
   2. After cleaning treat with JAX steel blackener.
   3. After blackening coat with 2 coats of matte Permalac lacquer
   4. After applying lacquer apply a coat of Renaissance Micro-Crystaline Wax, free of an acid base. Prohibited is use of Birchwood KC products.
      a. For wax product information, contact: Bauer Fabrication, Eric Bauer 1.802.244.4002

E. Field touch-up: Shall be the responsibility of the installing contractor and shall include the filling, and touch-up of exposed job made bolt or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and marks, and final cleaning up of the finished surfaces.
   1. Touch-up finishes shall be fully compatible with, and exactly match shop applied finish, color, texture and sheen.

PART 3 - EXECUTION

3.1 ERECTION - GENERAL

A. General: Accurately set all work to established lines and elevations, and rigidly fasten in place with suitable attachments to the construction of the building. At the completion of the work, check all work, re-adjust as required, and leave in perfect condition. Grind all exposed to view welds smooth to the touch.

B. Setting bearing and leveling plates:
   1. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
   2. 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.
      a. 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.
      b. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

C. Miscellaneous framing and supports: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and additional requirements indicated on Shop Drawings.
   1. Anchor supports for operable partitions, and similar products, securely to and rigidly braced to building structure.

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3.2 FIELD WELDING

A. Field weld components indicated on approved shop drawings in accordance with AWS D1.1. Weld profile, quality, and finish shall be consistent with approved samples and mock-ups.

1. Welds ground smooth: For groove welds, the weld shall be made flush to the surfaces of each side and be within + 1/16”, -0” of plate thickness.
2. Contouring and blending of welds: Where fillet welds are indicated to be ground contoured, or blended, oversize welds as required; grind to provide a smooth transition and to match profile on approved mock-up .
3. Continuous Welds: Where noted on the drawings, provide continuous welds of a uniform size and profile.
4. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.

B. Immediately after welding, touch-up welds, burned areas and damaged surface coatings.

1. Thoroughly remove all spatter by power wire-brushing (or if inaccessible, wire brushing) per SSPC, surface preparation specification SP2 or SP3. Allow surface to cool to ambient temperature. Clean surface with solvent wipe to remove oils, grease and dirt in accordance with SSPC surface preparation specification SP1.
2. Apply one coat of liquid zinc to attain a minimum of 1.5 mils dry film thickness. Coating should extend at least two inches beyond either side of weldment to ensure complete coverage of welded area.

3.3 FIELD BOLTING

A. Accurately drive all bolts into holes, protecting the bolt heads so as not to damage the thread during the driving. Ensure that bolt heads and nuts rest squarely against the metal. Where structural members have sloping flange faces, provide approved beveled washers at the bolted connections to afford square seating for bolt heads or nuts. Nick bolt threads for unfinished bolts to prevent the nuts from backing off.

1. Bolt Head Orientation: All bolt heads shall be oriented as indicated on the contract documents. Where bolt-head alignment is specified, the orientation shall be noted for each connection on the erection drawings. Where not noted, the bolt heads in a given connection shall be oriented to one side.

B. Use an approved calibrated manual or power torque wrench to obtain the proper torque and tension as recommended by the bolt manufacturer for all ASTM A 325 bolts.

3.4 TOUCH-UP

A. Touch-up all welds, burned areas, scratches, abrasions, on galvanized metals, using specified liquid zinc coating.

B. Touch-up all welds, scratches, abrasions, and other surface damaged on shop-primed or painted metals, using the same coatings as specified under shop applied finishes, herein above.

END OF SECTION

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SECTION 061000

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire retardant treated plywood backer panels for mounting of electrical panelboards, telephone/data backboards, HVAC and fire control equipment and other equipment.
2. Fire retardant ,3/4 inch plywood blocking in walls for Owner Furnished / Contractor Installed equipment, such as wall monitors, mounting brackets and similar items.
3. Plywood wall sheathing beneath gypsum wallboard partitions, including but limited to the following
   a. Door frames.
   b. Door stops, (wall mounted).
   c. Wall mounted railings.
   d. Window treatment.
   e. Products bracketed to walls, (including sinks, cabinets and similar products).
4. Various wood blockings, edgings, nailers, curbs, cants, grounds, furring, sheathing, framing members including wood preservative, as required for receipt of various finishes and surfacing materials, not described herein above.
5. Rough installation hardware, including bolts, screws, spikes, nails, clips, and connection assemblies, as needed for installation of the rough carpentry work.

B. Install the following furnished under the designated Sections:

1. Steel doors furnished by Section 081113 - HOLLOW METAL DOORS AND FRAMES.
2. Wood doors furnished by Section 081416 - FLUSH WOOD DOORS.
3. Door hardware, thresholds, weather stripping, seals and gaskets furnished by Division 8 - DOOR HARDWARE, as indicated on the Drawings.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 092216 - NON-STRUCTURAL METAL FRAMING: Metal framing for drywall construction work.

E. Section 092900 - GYPSUM BOARD: Wallboard construction work, having taped and compounded joint finish.

F. Section 099100 - PAINTING: Applied primer and finish coatings to exposed to view rough carpentry work.

G. Division 26 - ELECTRICAL: Providing and mounting electrical panels and equipment.

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1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. APA - applicable grades and specifications.
2. APA PRB-108 Performance Standards and Policies for Structural-Use Panels..
3. ANSI A250.11 (formerly SDI 105) - Recommended Erection Instructions for Steel Doors and Frames.
4. ASTM D 3201 - Test Method for Hygroscopic Properties of Fire-Retardant Wood.
5. AWPA Standards and references for preservative treated wood including Standards UC1, UC2, UC3A, UC3B, UC4A, and P5
6. AWPA Standard UCFA – Fire Protection as Required by Codes Above Ground Interior Construction.
7. AWPA Standard UCFB – Fire Protection as Required by Codes Above Ground Exterior Construction.
8. AWPA M4 – Care Of Preservative Treated Wood Products.
9. NER-643: ACQ Preserve® and ACQ Preserve Plus® Wood Preservative Treatment, ICBO Evaluation Service.
10. MIL L-1914OE - Lumber and Plywood, Fire Retardant Treated.
11. SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. SPIB Grading Rules, current edition.
13. UL - Building Materials Directory
14. US. Department of Commerce Voluntary Product Standard PS1 for Construction and Industrial Plywood.
15. US. Department of Commerce Voluntary Product Standard PS2 for Wood-Based Structural-Use Panels.
16. US. Department of Commerce Voluntary Product Standard PS-20 - American Softwood Lumber Standard.
17. U.S. Department of Commerce Simplified Practice Recommendation R-16, for sizes and use classifications of lumber
18. American Lumber Standards Committee, National Lumber Grades Authority for Canadian Lumber, and applicable grading rules and standards of the various lumber associations whose species are being used for grades specified.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work of this Section with the respective trades responsible for locating anchorages installed into blocking which is provided under this Section.
2. Coordinate work of this Section with the work of the various trades responsible for applying finish materials and other items to rough carpentry work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

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1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 –ADMINISTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for products specified herein.

2. Certifications:

a. Written certification from the respective treatment plants indicating types of wood preservative treatment and fire-retardant treatment used, treatments method, applications instructions, and conformance to the requirements specified herein.

1) Provide certification that fire retardant treatment materials do not contain ammonium phosphate.

2) Provide report from ICC Evaluation Service on fire retardant treated wood flame spreading, strength, corrosion and hygroscopic properties.

3) Provide report from ICC Evaluation Service on pressure preservative treated wood strength, corrosion, anti-fungi, and anti-insect properties.

B. Product Data: For each product specified.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, two to a minimum scale of 1-1/2 inch to 1 ft (1:8).

D. Samples: Submit two samples of wood trim 12 inch (300 mm) long.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

1. All lumber shall:

a. Be new, dressed four sides (S4S), clear and free from warping and other defects.

b. Have a moisture content not exceeding 19 percent when delivered to the project.

c. Be in accordance with the grading rules of the lumber manufacturer's association under whose jurisdiction the lumber is produced and bear the mark of grade and mill identification.

B. Certifications:

1. Plywood: Conform to the requirements of Product Standard PS-1, and bear applicable APA grade trademarks.

a. Plywood for electrical boards treated for retardance, meet Class I or a flame spread rating of 25 or less and bear U.L. label "Classified FRS".

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

B. Store all materials in an elevated dry location, protected by waterproof coverings.

PART 2 - PRODUCTS

2.1 BOARD AND SHEET MATERIALS

A. Lumber for blocking, nailers and curbs as indicated or required: Hem-Fir, Douglas Fir, Eastern Spruce, Eastern Hemlock, or Southern Pine, surfaced dried stud or utility grade.

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Wood members shall be of sizes indicated on the Drawings or of the same size as the members being braced.

1. 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.
2. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

B. Plywood and sheet products:

1. For electric panel board mountings and similar uses: APA graded B-D INT, Group 2 species, touch-sanded, fire-retardant treated, 3/4 inch thick, except as otherwise indicated on the Drawings.
2. For unspecified interior concealed from view locations: APA graded C-D PLUGGED INT, Group 2 species, thickness as indicated on the Drawings.

2.2 WOOD TREATMENTS

A. Treated wood products shall be produced by a single treatment plant, fully licensed by the chemical manufacturers, and conforming to the requirements specified herein.

1. Toxicity and Environmental Quality:
   a. Products containing chromium will not be permitted.
   b. Products containing arsenic will not be permitted.
   c. Fire-retardant-treated wood products shall be free of halogens, sulfates, ammonium phosphate and formaldehyde.
2. Dye wood or otherwise color code all treated wood at treatment plant to clearly distinguish the different treatments in the field.
3. Kiln dry all treated lumber and plywood to the following maximum moisture content after treatment.
   a. Lumber: 19 percent.
   b. Plywood 15 percent.
   c. Discard pieces with defects which might impair quality of work.
4. Quality marks: Each piece of lumber and plywood shall be permanently affixed with a quality mark, containing the following information:
   a. Identification of the inspection agency.
   b. Standard to which material was treated.
   c. Identification of the treating plant.
   d. Fire retardant treated wood shall include: stamp signifying a FR-S rating
   e. Preservative treated wood shall include: Retention and end use for which product is suitable.

B. Fire retardant treated wood. Designated as “FRTW”:

1. Chemical Manufacturer: Subject to compliance with the requirements specified herein, Products which may be incorporated in the work include:
   a. Hickson Corporation, product, “Dricon”.
   b. Osmose, Inc., Griffin GA., product “FirePro”.

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c. Hoover Treated Wood Products, Inc., Thomson, GA product “PyroGuard”.

d. Viance, LLC., Charlotte, NC, product: “D-Blaze FRT”.

2. Fire retardant treated wood shall comply with the following requirements:

a. All fire-retardant lumber and plywood must have an Underwriters Laboratories stamp signifying a FR-S rating certifying a 25 or less flame spread and smoke developed value, when tested in accordance to ASTM E-84, or UBC Standard No. 42-1.

b. Corrosion rates: Less than one mil per year for carbon steel, galvanized steel, aluminum, copper and red brass in contact with the fire retardant treated wood when tested in accordance with Federal Specification MIL-L-19140E Paragraph 4.6.5.2.

c. The fire retardant treated wood must have an equilibrium moisture content of not more than 25 percent when tested in accordance with ASTM D 3201 procedures at 95 percent relative humidity and 80 degrees Fahrenheit.

d. Fire retardant chemical: Registered for use as a wood preservative by the U.S. Environmental Protection Agency.

e. Testing: Fire performance and strength properties for both lumber and plywood, of the fire retardant treated wood shall be recognized by issuance of a ICC Evaluation Service Report. Fire retardant chemical must not damage the middle lammella of the wood structure when exposed to 170 degrees Fahrenheit and 90 percent relative humidity for 23 days.

C. Pressure preservative treated wood. Designated as “PT”:

1. Chemical Manufacturer: Subject to compliance with the requirements specified herein, Products which may be incorporated in the work include:

a. Osmose, Inc., Griffin GA., product “NatureWood”.

b. Universal Forest Products, Inc., Grand Rapids MI., product “ProWood ACQ”.

c. Viance, LLC, Charlotte, NC., product “Preserve”

2. Treatment: Ammoniacal Copper Quaternary Compound (ACQ), arsenic-free and chromium-free chemical “ACQ Preservative” in accordance with AWPA Standards. Apply the preservative in a closed cylinder by pressure process in accordance with AWPA Standard C15.

a. Minimum preservative retention for floor plates, framing, lumber and plywood above ground use: 0.25 pounds per cubic foot (4.0 kg/m3) of ACQ chemical, in accordance with AWPA UC1, UC2, UC3A, and UC3B, or NER-643 as appropriate.

b. Minimum preservative retention for framing, lumber and plywood in contact with water, ground, concrete and masonry: 0.40 pounds per cubic foot (6.4 kg/m3) of ACQ chemical, in accordance with AWPA UC4A, UC4B, UC4C, or NER-643 as appropriate.

c. Minimum preservative retention for lumber and plywood in permanent wood foundations: 0.60 pounds per cubic foot (9.6 kg/m3) of ACQ chemical, in accordance with AWPA UC4B, or NER-643.

3. Fixation of Chemical: Treated wood shall not be shipped from treatment plant until fixation of the preservative has occurred in the wood.

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2.3 ACCESSORIES

A. Adhesives:

1. General: Provide adhesives approved which are Low-VOC or non-VOC, non-flammable, water-proof after cured, odor free.

2. Adhesive for lamination and fabrication of wood and plywood items: Exterior adhesives containing no urea formaldehydes, having a VOC limit of 70 g/L.

3. Adhesive for subfloors and underlayment: High strength, waterproof and non-freezing adhesive complying with AFG-01 “Frozen Lumber Test” and ASTM 3498, and having a VOC limit of 50 g/L.

B. Nails (interior and exterior): Galvanized common nails, of size and type to suit application and as required by state and local building codes.

C. Screws:

1. Screws for interior applications: Flat head electroplated-galvanized wood screws of the appropriate sizes.

D. Anchor bolts, expansion bolts and lag screws: Hot-dipped galvanized steel, of the following types:

1. For lumber having actual thickness of 1-1/2 inches or greater to masonry and concrete: Anchor bolts or expansion bolts, as most applicable for the specific receiving surface material, 3/8-inch minimum diameter, spaced as shown on drawings, and staggered as far as practicable. Countersink all bolt heads, and provide head washers of matching material.

2. For lumber having actual thickness of greater than 7/8-inch but less than 1-1/2 inches to masonry and concrete: Anchor bolts or expansion bolts, as most applicable for the specific receiving surface material, at least 1/4-inch diameter of the most appropriate lengths for the specific application, spaced as shown, and staggered as far as practicable. Countersink all bolt heads, and provide head washers of matching material.

3. For lumber having actual thickness of 7/8-inch and less: Anchor bolts or expansion bolts, at least 1/4-inch in diameter; or screws, of the most appropriate sizes; in lengths most suitable for the specific application, countersunk, spaced, and staggered.

E. Protection paper: Canadian red-rosen paper or kraft paper.

F. Building paper: ASTM D 226, Non-perforated, No. 15 (73 kg/sq m) asphalt-saturated building felt.

PART 3 - EXECUTION

3.1 PREPARATION

A. All materials shall be inspected before use, with all checked, split and otherwise deficient stock rejected, or used only for miscellaneous blocking, furring or other incidental use. The Contractor shall be responsible for replacing all lumber which, due to warpage, twist, splitting, or checking, results in unsatisfactory work. Such replacement shall be required at any time, whether before or after application of finish material under other Sections.

B. Verify exact locations of wall mounted railing brackets, door stops, T.V. brackets and similar items with Architect prior to installation of blocking for accessories.

3.2 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

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B. Framing with Engineered Wood Products: Install engineered wood products to comply w... manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

D. Install shear wall panels to comply with manufacturer's written instructions.

E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Do not splice structural members between supports unless otherwise indicated.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

H. Field cuts of fire retardant treated lumber: Do not rip or mill fire retardant treated lumber. Only end cuts, drilling holes and joining cuts are permitted.

I. Field cuts of ACQ pressure-treated lumber: Apply solution of copper naphthenate containing a minimum of 2 percent metallic copper in-solution, in accordance with AWPA standard M4. Brush liberally all cuts and holes.

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 rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Retain one of first two subparagraphs below, as required to comply with requirements of Project and local codes.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
3. 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.
4. ICC-ES evaluation report for fastener.

3.3 INSTALLATION – EQUIPMENT BACKBOARDS

A. Provide panel mounting backboards for HVAC, Fire Prevention, Electrical and telephone/data equipment. Fabricate panels using fire-retardant treated 3/4 inch thick panels mounted to fire-retardant treated 2 by 4's. Provide a nominal space of 3-1/2 inches behind panels to permit wiring.

3.4 INSTALLATION - METAL DOOR FRAMES

A. Place in position all steel frames, furnished under Section 08 11 13 - Hollow Metal Doors and Frames, in accordance with the approved shop drawings and frame schedule. Place, erect and level all frames into correct scheduled locations, including those in masonry partitions.

1. During the installation of metal door frames, after the manufacturer's steel shipping bars have been removed, install wood spreaders at door opening, carefully dimensioned to permit square and plumb installation of door frames and doors.

a. Provide rigid temporary bracing for frames as required to ensure maintenance of positioning, and remove only after frames have been permanently anchored.

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b. For doors located in masonry work, maintain frame position with temporary brac...g until frames are built-into-place, and grout has sufficiently cured to maintain frame position.

c. Spreaders shall remain in place until doors are installed.

2. Coordinate installation of frames with the various trades installing abutting wall construction for anchor placement.

B. Coordinate installation of frames with installation of hardware under Section 06 20 00 - Finish Carpentry and as furnished under Section 08 71 00 - Door Hardware.

C. Install frames in accordance with the manufacturer's recommendations, ANSI/SDI-100, SDI-105, and the Door Hardware Institute (DHI) recommendations.

1. Secure frames with the following number of anchors per jamb.

a. For frames 7’-6” in height or less: 3 anchors per jamb.

b. For frames 7’-6” in height or less and having doors exceeding 3’-0” feet width, and for cross corridor frames: 4 anchors per jamb.

c. For frames greater than 7’-6”, up to 10’-0” in height: 4 anchors per jamb.

d. For frames greater than 7’-6”, up to 10’-0” in height, and having doors exceeding 3’-0” feet width, and for cross corridor frames: 5 anchors per jamb.

e. For frames over 10’-0’ in height: 5 anchors per jamb.

2. Where exposed fastener heads occur in frames, fill with automotive body filler and sand smooth.

3.5 TOLERANCES

A. Door frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

3.6 CLEANING

A. Daily clean work areas by sweeping and disposing of scraps and sawdust.

B. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

3.7 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 rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

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SECTION 062000

FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Finish carpentry items including:
   1. Interior trim to receive opaque filed finishing.
   2. Wood shelving and hardware.

B. Install the following furnished under the designated Sections:
   1. Plastic laminated shelves (for wall mounted adjustable shelving) furnished by Section 064000 - ARCHITECTURAL WOODWORK.
   2. Steel doors furnished by Section 081113 - HOLLOW METAL DOORS AND FRAMES.
   3. Wood doors furnished by Section 081416 - FLUSH WOOD DOORS.

C. Door hardware, thresholds, weather stripping, seals and gaskets furnished by Section 087100 - DOOR HARDWARE.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 064000 - ARCHITECTURAL WOODWORK:
   1. Furnishing and installing cabinetry, plastic laminated shelving, and other built-in-place furniture.
   2. Plastic laminated countertops.

1.3 SUBMITTALS

A. Product Data: For each product specified.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, two to a minimum scale of 1-1/2 inch to 1 ft (1:8).

C. Samples: Submit two samples of wood trim 12 inch (300 mm) long.
   1. Composite Wood and Agrifiber Products: Written documentation certifying that all composite wood and agrifiber products used on this Project contain no added urea-formaldehyde resins.
      a. Written certification indicating, that only “no added urea-formaldehyde” manufactured composite panel products are incorporated into the Work, including all concealed components. Composite panel products include but are not limited to particle board (PB), Medium Density Fiberboard (MDF), wheatboard and strawboard and similar manufactured products.
      b. Written certification indicating that laminating adhesives used in product fabrication on or off site do not contain any added urea-formaldehyde resins.

1.4 QUALITY ASSURANCE

A. Grade materials in accordance with the following:
   1. Hardwood Lumber: In accordance with NHLA Grading Rules; www.natlhardwood.org.

B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

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1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Protect work from moisture damage.

PART 2 - PRODUCTS

2.1 FINISH CARPENTRY ITEMS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI Architectural Woodwork Standards for Premium Grade.

B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

2.2 BOARD AND PANEL MATERIALS

A. Interior trim to receive paint (opaque finish):
1. Typical: Clear straight-grained poplar, C-Select or better.
2. At locations which at least 7 feet above finished floor: Clear straight-grained Poplar, Sugar Pine, Ponderosa Pine, or Idaho White Pine, C-Select or better.

2.3 CLOSET AND SHELVING HARDWARE

A. Metal closet rods and brackets:
1. Closet pole: 0.087 inch (2.21 mm) wall thickness steel tubing, 1-1/16 inch diameter, of custom cut lengths required for full width of closet, chrome finish.
   a. Provide intermediate supports for span lengths greater than 48 inches.
2. Wall mounted standards and brackets adjustable shelving, (Plastic laminate shelving as furnished be Section 064000):
   a. Acceptable manufacturers, include the following, or approved equal:
      1) Knape & Vogt, Grand Rapids, MI.
      2) Spur Systems International Limited.
      3) Reeve Store Equipment Company (ReeveCo), Pico Rivera, CA.
3. Standards (uprights): 14 gage double tracked uprights, in epoxy powder-coat finish, color as selected by Architect from manufacturer's full range of colors.
   a. Locate uprights no greater than 24 inches on center.
4. Brackets: 14 gauge formed brackets, color and finish matching standards,
   a. Depth (typical): 270mm (10-1/2 inch depth), or as otherwise indicated on Drawings.

2.4 FASTENINGS

A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

B. All fasteners to be concealed from view in final installation.

C. Concealed Joint Fasteners: Threaded steel.

D. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.

E. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

2.5 ACCESSORIES

A. Primer: Alkyd primer sealer.

B. Wood Filler: Solvent base, tinted to match surface finish color.

C. Moldings and Trim: Type 304 stainless steel, sizes and profiles as indicated.

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D. Marker tray, (Located in Staff Break Room No. 131 at dry-erase wall): Continuous box type aluminum marker tray with slanted front and cast plastic end closures. Marker tray length as indicated on the Drawings.
   1. Equal to Claridge Products and Equipment, Inc, http://www.claridgeproducts.com

2.6 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Fit exposed sheet material edges with 3/8 inch (9 mm) matching hardwood edging. Use one piece for full length only.

C. Shop prepare and identify components for book match grain matching during site erection.

D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.7 SHOP FINISHING

A. Shop finish woodwork items where practical, otherwise prep for site finishing.

B. Apply wood filler in exposed nail and screw indentations.

C. Finish work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5 - FINISHING for Grade specified and as follows:

D. Transparent and stained finish as specified in Section 099000 – Painting and Coating.

E. Back prime woodwork items to be field finished, prior to installation

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards requirements for grade indicated.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (1 mm). Do not use additional overlay trim to conceal larger gaps.

D. Install aluminum molding and trim according to manufacturer’s instructions at wood panel and decorative glass locations where indicated.

3.3 INSTALLATION - DOORS AND HARDWARE

A. Install doors in accordance with the manufacturer's recommendations, ANSI/SDI-100, ANSI A250.11, and the Door Hardware Institute recommendations.

B. Install hardware in accordance with manufacturer's instructions and requirements of referenced organizations, and the requirements of Section 087100 - DOOR HARDWARE.
   1. Use the templates provided by hardware item manufacturer.
   2. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with the governing regulations.
      a. Conform to ANSI 117.1 for positioning requirements for the handicapped.
      b. “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” by the Door and Hardware Institute (DHI.)
      c. WDMA Industry Standard I.S.1.7, “Hardware Locations for Wood Flush Doors”.
   3. Installation of hardware shall comply with NFPA 80 and NFPA 101 requirements.

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4. Pre-fit hardware before finish is applied, remove and reinstall after finish is completed. Install hardware so that parts operate smoothly, close tightly and do not rattle.
5. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

C. Tools for maintenance: All special tools packaged with hardware items shall be saved, tagged/identified as to product use, and turned over to the Owner upon completion of the Work.

D. Clean adjacent surfaces soiled by hardware installation.

E. Prior to Final Inspection make final check and adjustment of all hardware, clean operating items as necessary to restore proper function and finish of hardware.

3.4 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 099000.

3.5 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch (1.5 mm).

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.7 mm).

C. Maximum variation for doors and frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

3.6 ADJUSTING

A. Adjust doors for smooth and balanced movement.

3.7 CLEANING

A. Daily clean work areas by sweeping and disposing of scraps and sawdust.

B. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

C. Remove protective material from pre-finished surfaces.

3.8 PROTECTION

A. During the operation of finish carpentry, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

END OF SECTION

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SECTION 064000

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this Section consists of shop fabricated millwork and architectural woodwork where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.

B. Furnish and install the following:

1. Plastic laminate casework.
2. Plastic laminate countertops.
3. PVC edging of plastic laminate at edges of doors, drawer fronts, casework fronts, countertops and shelving.
4. Exposed blocking and blocking concealed by the work of this Section required for the installation of architectural woodwork.
5. Hardware for work of this Section, including custom fabricated hardware and accessories.

C. Furnish the following products to be installed under the designated Sections:

1. Plastic laminate shelves (for wall mounted adjustable shelving) for installation under Section 062000 - FINISH CARPENTRY.
2. Wood trim and wall base having shop-applied transparent finish, for installation by Section 062000 - FINISH CARPENTRY.

D. Make all cut-outs within casework items as required to accommodate sinks, piping, conduit, and other mechanical and electrical work, from templates provided by the respective mechanical and electrical trades.

E. No attempt is made in this Section to list all elements of architectural woodwork required on this project or to describe how each element will be installed. It is the responsibility of the Contractor to determine for itself the scope and nature of the work required for a complete installation from the information provided herein and in the Drawings.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 061000 - ROUGH CARPENTRY: Concealed wood blocking and nailers.

E. Section 062000 - FINISH CARPENTRY:

1. Installation of plastic laminate shelving furnished under this Section 064000.
2. Installation of wood interior trim and wall base furnished under this Section 064000.

F. Section 092216 - NON-STRUCTURAL METAL FRAMING: Metal framing for drywall construction work.

G. Section 092900 - GYPSUM BOARD: Wall board construction work, having taped and compounded joint finish.

H. Division 22 - PLUMBING: Plumbing fixtures and piping.

I. Division 26 - ELECTRICAL: Electrical connections for power, lighting, and data.

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1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM D 523 - Standard Specification for Specular Gloss.
2. AWI (Architectural Woodwork Institute) Architectural Woodwork Standards (1st Edition, 2009).
3. APA Grades and Specifications.
4. National Lumber Grades Authority, American Lumber Standards, and Grading Rules and Standards of the various lumber associations whose species are being used, with grade-marks for same.
5. U.S. Department of Commerce Simplified Practice Recommendation R-16, for sizes and use classifications of lumber; and Product Standard (PS):
   a. PS-1 - Construction and Industrial Plywood Standard.
   b. PS-20 - American Softwood Lumber Standard.
   c. PS-51-71 – Hardwood Plugged Plywood Standard.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:

1. Field Measurements: Where possible the woodwork manufacturer shall take field measurements before preparation of shop drawings and fabrication to ensure proper fitting of Work.
   a. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.
2. Field dimensions which are not controlled by Project conditions: The woodwork manufacturer is responsible for details and dimensions not controlled by Project conditions and shall show on his shop drawings all required field measurements beyond his control.
   a. The Contractor shall acknowledge the woodwork fabricator's need for accurate field dimensions prior to custom fabrication.
   b. The Contractor and the woodwork manufacturer shall cooperate to establish and maintain these field dimensions.

B. Scheduling:

1. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
2. Coordinate schedule of construction, size of access, and route to location of installation to prevent delay of installation due to physical impediments. Any work involving the demolition and reconstruction of partitions, walls, floors, roofing, windows, or doors to place and install the work of this Section shall be performed at no additional cost to the Owner.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, for each item furnished hereunder, including, but not limited to: Fastenings, adhesives, hardware, and accessories.

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2. Shop drawings bearing dimensions of actual measurements taken at the project, include at least the following, which are in addition to shop drawing requirements described in AWI Quality Standards:
   a. 1/4 inch scale elevations and plans of each casework item.
   b. Large scale design details of minimum 1-1/2 inch to 1-foot scale, showing abutting materials, installation conditions, clearances. Show profiles, jointing and fastening methods; details of drawers and doors.
   c. Full size or half-full size sections, showing individual components, profiles and jointing.
3. Selection Samples:
   a. Plastic laminate chips for initial color selection by the Architect.
   b. Chain of PVC edging materials.
   c. Provide additional samples as requested by the Architect for initial selection of material colors and finishes.
4. Verification Samples:
   a. Cabinet hinge with manufacturer's product literature.
   b. Drawer slide with manufacturer's product literature.
   c. 12 inch long samples of solid hardwoods illustrating maximum range of color variations and applied transparent shop finish.
   d. 12 by 12 inch samples of plastic laminate (of each color required for project).
   e. 12 inch length samples of plastic edging material (of each color required for project).
   f. One each of all cabinet hardware. (approved cabinet hardware samples will be returned to Contractor and may become part of the Work).

B. Certificates: Wood products lacking acceptable documentation for the following will be rejected and their removal required.
1. Composite Wood and Agrifiber Products: Written documentation certifying that all composite wood and agrifiber products used on this Project contain no added urea-formaldehyde resins.
   a. Written certification indicating, that only "no added urea-formaldehyde" manufactured composite panel products are incorporated into the Work, including all concealed components. Composite panel products include but are not limited to particle board (PB), Medium Density Fiberboard (MDF), wheatboard and strawboard and similar manufactured products.
   b. Written certification indicating that laminating adhesives used in product fabrication on or off site do not contain any added urea-formaldehyde resins.
2. Manufacturer's Instructions: Provide installation instructions and templates for hardware and field applied items.
3. Source Quality Control Submittals: AWI letter of licensing for the project for AWI Quality Certification Program.

C. Closeout Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

1.6 QUALITY ASSURANCE

A. Quality Standards: All work performed under this Section shall be as defined in the referenced AWI "Quality Standards" for PREMIUM GRADE, as modified herein by this Specification Section.

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B. Qualifications:

1. Fabricator/Installer: Work of this section shall be performed by a firm licensed by the AWI Quality Certification Program.

   a. Woodwork fabricator/installer is required to be licensed by AWI as competent to perform the work specified. Certification shall be evidenced through the application of AWI Quality Certification labels and issuance of an AWI letter of licensing for the project. AWI certification labels shall be applied to each item of work.

1.7 MOCK-UPS

A. Provide mock-up under provisions of Section 014000 - QUALITY REQUIREMENTS.

B. Mockups: Before fabricating and installing interior architectural woodwork, sub-contractor shall build a mockup to verify selections made under Sample Submittals and to demonstrate hardware operation, aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Mockup configuration shall be as indicated on the Drawings. If not indicated on the Drawings, mockup shall consist of one entire length of upper cabinets, one entire length of lower drawers/cabinets, countertop, and all applicable hardware.

   a. The mockup shall fully demonstrate the proposed range of aesthetic effects, workmanship, and the operation of all hardware, including but not limited to cabinet hinges, drawer slides, and pulls.

2. Obtain Owner and Architect's approval of mockups before starting interior architectural woodwork fabrication.

3. Build mockups in the location as indicated on the Drawings or, if not indicated, as directed by the Architect.

4. Notify Architect seven days in advance of dates and times when mockups will be fabricated and installed.

5. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed Work.

6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

7. Demolish and remove mockups when directed.

C. Locate mock-ups where directed and include all surfaces and materials scheduled to receive a field applied finish.

1.8 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. General: The woodwork manufacturer, woodwork installer and the Contractor are jointly responsible to make certain that woodwork is not delivered until the building and storage areas are sufficiently dry so that the woodwork will not be damaged by excessive changes in ambient humidity and relative moisture content.

2. Concrete, masonry, plaster, tile and marble setting and polishing and other wet work shall be completed and dry before delivery, storage and installation of woodwork items.

3. Sequence deliveries to avoid delays and to minimize on-site storage.

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B. Storage and Handling Requirements:

1. Ship and handle all materials and fabricated items in a manner which will prevent damage thereto, and store all materials and fabricated items at a dry, elevated, ventilated, and protected interior location.

1.9 SITE CONDITIONS

A. Temperature: Maintain ambient temperature above 55 degrees Fahrenheit for 5 calendar days before, and during installation of architectural woodwork; maintain temperature after installation until Owner's Final Acceptance.

B. Relative Humidity: Maintain a relative humidity between 25 and 55 percent for a minimum period of 5 calendar days before, and during, installation of architectural woodwork: maintain relative humidity after installation until Owner's Final Acceptance.

PART 2 - PRODUCTS

2.1 WOOD MATERIALS – GENERAL REQUIREMENTS

A. General requirements: New, dressed four sides (S4S), and free from warping and other defects.

1. Panel Products: Composite panel products and plywood shall be "no added urea-formaldehyde", including all concealed components.

2. Softwood plywood with each sheet bearing the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The mark shall identify the plywood by species group or identification index, and shall show glue type, grade and compliance with APS-1. Plywood shall be a minimum of 5 ply for ½ inch thick and above, and 7 ply for plywood 1-1/4 inch thick or thicker.

a. Plywood cores for plastic laminate shall be exterior type and species group, with veneer grade "A-C".

b. Plywood shelving for painted or stained finish shall be interior type of any species group, with veneer grade "A-B" for stained finish and grade "B-C" for painted finish

2. Moisture Content:

a. Solid hardwood(s) scheduled for transparent finish: Moisture content shall not exceed 8 percent when delivered to Project.

b. Typical (hardwood and softwoods): Moisture content of wood shall be between 5 and 10 percent when delivered to the project.

B. Wood Species, (Designated as **WD-1a)** as indicated on the Drawings:

1. Exposed wood scheduled for transparent finish (for tops, tack board frames, and edge trim), meeting AWI Premium Grade Standards (as installed): White Oak (Quercus alba), Plain Sliced, Grade A., Plain Sliced.

a. Veneer shall be clear, without knots, and other natural defects.

C. Solid wood base having stained finish to match Architect's sample:

1. Height and profile as indicated on the Drawings/Finish Legend.

2. Wood Species: White Oak (Quercus alba), Plain Sliced, Grade A.

D. Concealed supports for edge and corner backing shall be kiln dried birch or poplar, meeting AWI Premium Grade Standards.

E. Blocking and furring at base and walls shall comply with American Softwood Lumber Standard PS 20-70 and with specific grading requirements of SPIB: Kiln dried (KD15), Structural Light Framing, Nº. 2 grade, free of warping and large knots.

F. Internal concealed framing for casework: Kiln-dried, (KD15), eastern pine, poplar, eastern spruce, or southern pine, conforming to AWI Premium grade.

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G. Fir plywood for concealed from view applications in conjunction with the various casework items: APA C-C PLUGGED EXT.

2.2 PLASTIC LAMINATE FACING

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Ralph Wilson Plastics Co. (Wilsonart), Temple, TX.
2. Formica Corp., Cincinnati, OH.
3. Pioneer Plastics Corp. (Pionite), Auburn, ME.
4. Laminart, Elk Grove Village, IL.
5. Nevamar Corp., Odenton, MD.

B. Plastic laminate, general purpose, conforming to NEMA LD3.1 -1991 Grade GP50, nominal 0.050 inch thickness, in a low non-directional texture in color price group selected by the Architect.

1. General purpose grade laminate shall be used for all exposed to view surfaces including:
   a. Exposed outward face of cabinet fronts and closure trim.
   b. Cabinet doors (all sides).
   c. Drawer fronts (all sides).
   d. Interior surfaces of open cabinets (without doors).
   e. Plastic laminated trim.
2. General purpose grade laminate shall be used for counter tops except where colored core laminate is indicated.

C. Plastic laminate, cabinet interior grade, conforming to NEMA LD3-1985 Grade CL20, 0.020 inch nominal thickness, in a low non-directional texture in solid color price group as selected by the Architect.

1. Cabinet interior grade laminate may be used for the interior surfaces of all ‘closed cabinets,’ where general purpose grade is not required.
2. All shelving shall be cabinet interior grade.

D. Plastic laminate, unfinished balancing (backer) sheet, conforming to NEMA LD3-1985 undecorated laminate, Grade BK20, 0.020 inch nominal thickness.

E. Edging:

1. Edging for plastic laminate shelving: Flexible polyethylene tee moulding, having a 3/4 inch face, equal to Outwater Plastics, Woodridge NJ., (telephone 800 835-4400), model number 105-679, in custom color to match plastic laminate surface finish. Samples to be supplied to and reviewed for approval by the Architect.
   a. All sides of shelving, regardless of their exposure, shall receive edging.

2.3 BACKING FOR LAMINATES

A. All laminate components with the exception of all toe spaces: Mattformed three layer medium density panel (PB), graded M2 per ANSI A 208.1 with a minimum density of 48 pounds per cubic foot or equivalent hardwood plugged plywood complying with PS 51-71.

1. “No Formaldehyde Added”: Provide board which is fabricated using pre-consumer recycled wood fibers and an exterior-grade urea-formaldehyde free resin binder. Product shall contain no formaldehyde additives. Acceptable products include the following or approved equal.
   a. Collins Pine Company (distributed through Panel Source International, Tacoma, WA), product: “PureKor Particleboard Plus”

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b. Plummer Forest Products, Post Falls, ID, product “PFP particleboard”.
c. Rodman Industries, Oconomowoc, WI, product: “Rodman Resincore I”.
d. SierrePine Inc., Martel, CA, product “Encore SDP”

2. Thicknesses:
   a. 3/4 inch thick at cases.
   b. 1 inch thick at shelves under 30 inches wide.
   c. 1 1/8 inch thick at shelves 30 inches or more wide.
   d. 1 1/8 inch thick at counters without sinks.
3. Thicknesses:
   a. Typical: 3/4 inch thick panels, except as otherwise indicated or specified.
   b. Doors over 36 inches tall: provide 1-1/4 inch thick panels.

B. At all toe spaces: APA MARINE A-A EXT, fir veneer marine grade plywood, with plugged cores and sanded faces, 3/4 inch thick.

2.4 CABINET HARDWARE

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering similar products include the following:
1. Sugatsune, Chicago, IL, www.sugatsune.com
2. Accuride Corp., Santa Fe Springs, CA.
3. CompX International, Inc., Dallas, TX.
4. Doug Mockett & Company, Inc., Manhattan Beach, CA.
5. Engineered Products Company, Flint, MI.
6. Glynn-Johnson, Indianapolis, IN.
7. H.B. Ives Company, Wallingford, CT.
8. Häfele America Company, Archdale, NC.
9. Julius Blum, Inc. , Stanley, NC.
10. Knape & Vogt, Grand Rapids, MI.
11. (Lamp) Sugatsune America, Inc. Carson, CA..
12. Mepla Inc., High Point, NC.
13. Outwater Plastic Industries Inc., Woodridge, NY.
14. Stanley Hardware, New Britain, CT.
15. Waterloo Furniture Components, Ontario, Canada.

B. Door and drawer pulls:
1. Cabinet and drawer pulls: Model No. 2650, 7-9/16 inches center-to-center, 26 Series stainless steel as manufactured by Sugatsune, www.sugatsune.com.
2. Full-height cabinets and wardrobes: Model No. 2653, 13-15/32 inches center-to-center, 26 Series stainless steel as manufactured by Sugatsune, www.sugatsune.com.

C. Locks:
1. General:
   a. All cabinet doors shall have locks.
   b. Provide at least three keys per keyed alike group.
   c. Finish: lock plug finish “nickel”.
2. Locks for drawers and doors: deadbolt type.

D. Catches: Magnetic touch latch type.

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E. Roller latches: Head frame mounted, stainless steel or cast bronze with brushed chrome finish, conforming to ANSI A 156.16, with manufacturers standard strike, equal to Glynn-Johnson model "1152B - Combination Roller Latch/Angle Stop".

F. Casework hinges:

1. General:
   a. All hinges shall be screw-on type. No press-in or insertion type hinges will be accepted.
   b. All hinges, after installation, shall be integral with the base plate and substrate, providing a contiguous system that insures against accidental release.
   c. All hinges shall withstand a weight load of 150 pounds, minimum.
2. Casework hinges: five knuckle institutional, offset type for all swinging doors. Hinges shall be 2-1/2" long. Hinges are mounted with flathead screws, so applied to cabinets to withstand a weight load of 150 pounds minimum. Hinge finish: satin stainless steel.
   a. Number of hinges:
      1) Doors 48 inches and less in height: 2 hinges.
      2) Doors over 48 inches in height: 3 hinges.
3. Hinge for full overlay cabinet doors: Self closing concealed hinge having maximum 120 degree angle of opening. Hinges shall be equal to Blum “Screw-On – 71T5550”, with straight arm configuration.
   a. Number of hinges: Provide number of hinges indicated in Drawings, or if not indicated, provide number recommended by manufacturer for size and weight of door.
   b. Number of hinges: Provide number of hinges indicated in Drawings, or if not indicated, provide number recommended by manufacturer for size and weight of door.

G. Pad silencers for doors: 10 mm (3/8 inch) diameter, self-adhesive resilient plastic or nylon buttons, at least 2 per door, in clear color.

H. Drawer Slides (provide one pair per drawer except as noted otherwise):

1. For desk and casework drawers (excluding file drawers): Full extension type, 100 pounds per pair minimum rated capacity, steel ball bearing rollers, lever disconnect, drawer hold in detent feature.
   a. Acceptable slides, include the following, or approved equal:
      1) Accuride Nº. 3832A
      2) Knape and Vogt Nº. 8400.
      3) Häfele Nº. 3832.
   b. Finish: clear lacquered zinc.
2. For pencil drawers: 3/4 extension type, 45 pounds per pair minimum rated capacity, steel ball bearing rollers, friction disconnect.
   a. Acceptable slides include the following, or approved equal:
      1) Accuride Nº. 2006 (regular mount), Nº. 2009 (bracket mount).
      2) Knape and Vogt Nº. 8200
      3) Häfele Nº. 2009
3. For under drawer mounting: Single extension type, 35 pounds minimum rated capacity, steel ball bearing rollers, drawer hold in detent feature.
   a. Acceptable slides include the following, or approved equal:
      1) Accuride Nº. 1029.
      2) Knape and Vogt Nº. 1500.

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3) Häfele Nº. 423.55.9xx 7xx (Note: xx number will vary depending on depth of drawer).

b. Finish: clear lacquered zinc.

I. Shelf supports.

1. Shelf pins for laminated shelving: plug-in type for 5mm diameter hole, Häfele model number 282.11.710 cast zinc alloy with nickel plated finish and recessed seat.

J. Wire management grommets and covers: 2 inch diameter, as manufactured by Doug Mockett & Company, Manhattan Beach CA., model number " MM3 with 3A cover" or approved equal.

1. Grommet Finish: Provide in metallic finish selected by the Architect from Manufacturer's standard finishes.

2. Locations: Provide where shown on Drawings, and if not shown, allow the following numbers of grommets; exact locations to be determined in field.

a. For counters 6 feet or less provide 2 wire grommets and covers.

b. For counters over 6 feet, provide 1 wire grommet and cover for every 42 inches of counter, or fraction thereof.

K. Wire management conduit and receptacle system: Medium voltage wire conduit system as manufactured by the Wiremold Company, West Hartford, CT.

2.5 ACCESSORIES

A. Edge protection: Stylex trim piece for all edges and corners as indicated on the Drawings.

B. PVC Edging for plastic laminate casework:

1. Manufactured by The Cloverdale Company (Band-it Brand), Cloverdale VA., or equal.

2. Thickness: 2mm thick for door and drawer edges; 1mm for exposed edges of casework bodies.

3. Edges: Square.

4. Custom colors to match plastic laminate colors.

C. Edging for adjustable shelving: Flexible PVC tee moulding, having equal to Outwater Plastics, Woodridge, NJ, in color as selected by the Architect.

1. All sides of shelving shall receive edging, regardless of exposure.

D. Edging for countertops: Flexible self-healing, PVC bumper shaped tee molding, having a 1-1/4 inch face, equal to Outwater Plastics, Woodridge, NJ, model number 303-1250, in custom color to match plastic laminate surface finish. Samples to be supplied to and reviewed for approval by the Architect.

E. Glue for lamination and fabrication of wood and plywood items: Exterior Grade, phenolic resin glue.

F. Counter support brackets: Equal to Rakks Counter Supports by Rakks/Rangine Corp, Needham, MA, with standard white color powder coat finish.

1. Model EH-1818 for 24 inch counters.

2. Model EH-1824 for 30 inch counters.

G. Sealant, for joints between countertops and dissimilar materials: Refer to Section 079200 - JOINT SEALANTS.

H. Fasteners:

1. Concealed joint fasteners: Threaded steel.

2. Bolts, nuts, washers, lags, pins, and screws: Of size and type to suit application chrome finish in exposed-to-view locations.

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2.6 FABRICATION - GENERAL

A. Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Architect.

B. Coordinate the fabrication of casework with that of the various trades responsible for installing materials and items which will be inserted into, or applied to, the casework surfaces. Obtain and verify templates, dimensions, and instructions from the respective trades before making cut-outs, holes, slots, and other cutting in the casework.

C. Shop assemble custom casework for delivery to site. Deliver in assemblies as large as possible for entrance into the designated areas. Provide for concealed job connections of adjacent units.

D. Fabricate, install and finish all work so that both sides of countertops, panels, doors, shelves and other casework are of balanced construction, to prevent warping.

E. Fit corners and joints hairline, secure with concealed fasteners.

F. Finish all solid wood and plywood surfaces smooth, and free from all machine and tool marks that will show through the wood veneer or facing materials.

G. Make all joints tight, and form to conceal shrinkage. Glue all miters having a dimension of 4 inches or more from heel to point.

H. Provide shop fabricated counters, shop mitered components, closure trims with ample allowance for field cutting and fitting. Provide additional trim as required for scribing and site cutting.

I. Finished work shall be free from visible adhesive and pencil marks.

2.7 FABRICATION - CASEWORK

A. Fabricate casework in accordance with requirements of specified AWI Grade and the following additional requirements:

1. Cabinets shall be in flush overlay construction, with drawer fronts and hinged doors overlapping openings a minimum of 1/4 inch all four sides.
2. Fabricate cabinets in integral units, each completely enclosed, without the use of common partitions.
3. Fabricate plastic laminated casework with top and bottom fillers and corner panels described as optional for Custom Grade Work in the Quality Standards.
4. Drawers:
   a. Laminated drawer fronts: High density laminate over 3/4 inch specified core material. Drawer fronts shall be applied to separate drawer body component sub-front.
   b. Drawer bottoms (plastic laminated casework): 1/4 inch thick color polyester laminate, housed and glued into front, sides and back.
   c. Underside of drawer to receive continuous hot melt glue at joint between bottom and back/sides/front for sealing and rigidity.
   d. Reinforce drawer bottoms as required with intermediate spreaders.
5. Doors: Square edge design, 3/4 inch thick, without any profiling and shall fully overlap the cabinet frame.
   a. Laminate doors: Fabricate doors with particle board core and front and rear faces high-pressure laminate, of selected color.
   b. Maintain a maximum 1/8" reveal between pairs of doors, between door and drawer front, or between multiple drawer fronts within the cabinet.
6. Base cabinets: Provide full horizontal top frame with glued and doweled joints, 3/4 inch plywood end panels and bottom. Bottom shall be glued and doweled and let into

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routed end panels. Provide 4 inch high toe rail, securely screwed to the end panels and to the bottom panel by concealed glue blocks.

7. Wall cabinets: Provide same finishes as base cabinets, with 3/4 inch thick top and bottom veneered plywood panels. Top and bottom panels shall be glued and doweled and let into routed end panels. Back of case shall be recessed and let into routed end panels and further secured with glue blocks.
8. Door and drawer spreaders: Provide minimum 3/4 thick full width cabinet body spreaders immediately behind all door/drawer and multiple drawer horizontal joints to maintain exact body dimensions, and close off reveal. Front edge to be match face of adjacent cabinet doors/drawers.

2.8 FABRICATION OF PLASTIC LAMINATE CLAD ITEMS

A. Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Architect.

B. Except as otherwise specified hereunder, fabricate plastic laminate clad items in strict accordance with the details on the Drawings, the approved shop drawings, and workmanship standards set forth in the AWI Quality Standards Section 400, for specified Quality Grade.

C. Shop fabricate all plastic laminate clad items. Adhere plastic laminate to particle board backing sheets by cold-press-method. Use of contact cements are not permitted. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Apply laminate backing sheet to reverse side of all laminated, panels, shelving and tops.

D. Cap edges with specified banding, matching color of plastic laminate panels.
1. Casework facing: Machine apply flat PVC banding, 0.018 inch (0.050 mm), using waterproof hot melt adhesive.
2. Drawer and door fronts: Machine apply to all four edges, 2mm thick PVC banding, using waterproof hot melt adhesive, corner radiused profile for consistent design and safety.
3. Shelving: Machine apply to all four edges, 2mm thick PVC banding, using waterproof hot melt adhesive, corner radiused profile for consistent design and safety.

E. Fit corners and joints hairline. Make all joints and miters tight, secure with concealed fasteners.

2.9 FACTORY FINISHING

A. General: Factory finish to be to comply with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations.

B. Transparent finish: AWI Premium Grade Factory Finish System 5, having a Medium rubbed effect with a sheen of 24° to 28° gloss units per ASTM D523. Finish system shall not substantially increase flame spread.
1. Finish system shall include the following:
   a. Wash coat, reduced conversion varnish.
   b. Wash coat, vinyl.
   c. Stain coat.
   d. Sealer, reduced conversion varnish.
   e. Sealer, vinyl.
   f. First topcoat.
   g. Second topcoat.

C. Concealed surfaces: Thoroughly coat all concealed surfaces of finish woodwork before assembling with two coats of clear wood preservative.

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D. Field Touch-up: Shall be the responsibility of the installing contractor and shall include the filling, and touch-up of exposed job made nail or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and marks, and final cleaning up of the finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.

1. Verify adequacy of blocking, backing and support framing for all finish carpentry work.
2. Examine pre-fabricated woodwork before installation and verify that back priming has been completed and all packing has been removed.
3. Do not install base cabinets and other floor mounted casework unless the finished floor is in place.
4. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

A. Before installing work under this section, woodwork shall be conditioned to average prevailing humidity conditions in areas of installation.

B. Protect other Work against undue soilage and damage by the exercise of reasonable care and precautions. Clean, repair, or replace any work so damaged and soiled to the acceptance of the Architect.

3.3 INSTALLATION - GENERAL

A. Install work in accordance with the latest AWI quality standards in grade specified herein, under the Article entitled “QUALITY ASSURANCE”.

B. Woodwork shall be installed plumb, level, true and straight without distortions.

1. Use concealed shims as required.
2. Work shall be installed to a tolerance of 1/8 inch in 8 feet for plumb and levelness, including tops.
3. There shall be no variations in flushness of adjoining surfaces.

C. Tops and woodwork shall be scribed and trimmed to fit adjoining work.

1. Where cuts occur, refinish surfaces and repair damaged finishes

D. Secure woodwork to anchors or built-in blocking or blocking directly attached to substrates.

1. Secure woodwork to grounds, furring, stripping and blocking as required with countersunk, concealed fasteners and blind nailing performing a complete installation.
2. Use thin gauge finishing nails for exposed nailing, countersunk and filled flush with woodwork finished surface.
   a. Match final finish materials where transparent finish is indicated.

3.4 INSTALLATION - CASEWORK AND COUNTERTOPS

A. Install casework without distortion so that doors and drawers fit openings properly and are accurately and evenly aligned.

1. Install end cabinet panels with a continuous bead of Sealant Type SL applied to bottom edge that abuts finish flooring. Immediately remove all excess sealant from surfaces of the casework and flooring.

B. Adjust casework hardware centering the doors and drawers in the openings, and provide unencumbered operation.

C. Complete the installation of hardware and accessory items as indicated.

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D. Maintain veneer sequence matching of casework with transparent finish, where so manufactured.

E. Tops: Anchor tops securely to base units and to other support systems as required.

F. Install back and side splashes with a continuous bead of Sealant Type SL applied to splash edges that abut countertop materials and adjoining splashes. Immediately remove all excess sealant from surfaces of the casework.

3.5 FIELD FINISHING

A. Except where expressly noted otherwise on Drawings, shop finish all woodwork. Where field finishing is indicated or scheduled on Drawings, finishing Work shall be as specified under Section 099100 - PAINTING.

3.6 TOLERANCES

A. Maximum variation from true position 1/16 inch with a maximum of 1/32 inch offset from true alignment with adjoining surfaces intended to be flush.

3.7 ADJUSTING

A. To whatever extent work was not completed at shop or prior to installation of woodwork, perform and complete the specified finishing of woodwork.

B. Repair damaged and defective woodwork where possible eliminating defects functionally and visually.

1. Where not possible to repair damaged or defective work, replace with matching new work.
2. Adjust joinery for uniform appearance.

C. Adjust doors and drawers for smooth and balanced movement, lubricate hardware for use.

3.8 CLEANING

A. Daily clean work areas by sweeping and disposing of scraps and sawdust.

B. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area leave area in broom-clean condition.

C. Remove protective material from pre-finished surfaces, immediately prior to Final Acceptance.

D. Carefully clean exposed and semi-exposed wood surfaces, in strict accordance with fabricator's instructions. Touch-up shop-applied finishes to restore damaged or soiled areas, matching adjoining finish.

E. Wash down plastic laminate with a solution of mild detergent in warm water, applied with soft clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

F. Clean and polish hardware, and bright metal trim components.

3.9 PROTECTION

A. Protect installed woodwork and maintain specified conditions, in a manner acceptable to both fabricator and installer. Ensure that work of this Section will not be damaged or soiled, and is completely free of defects at the time of final acceptance of Project by the Architect.

END OF SECTION

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SECTION 072600

VAPOR RETARDERS

PART 1 – GENERAL

1.1 SUMMARY

A. Furnish and install the following:

1. Sheet membrane vapor barriers (vapor retarders) under concrete slabs-on-grade including seam tape, and pipe boots.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 033000 - CAST-IN-PLACE CONCRETE: Concrete slab in-fill work.

1.3 REFERENCES

A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM D 570 - Water Absorption of Plastics.
2. ASTM D 1004 - Initial Tear Resistance of Plastic Film and Sheeting.
3. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.
4. ASTM D 1938 - Tear Propagation Resistance of Plastic Film and Thin Sheeting by a Single-Tear Method.
5. ASTM D 2842 - Water Absorption of Rigid Cellular Plastics.
6. ASTM D 2582 - Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
7. ASTM D 2856 - Open Cell Content of rigid Cellular Plastics by Air Pycnometer.
8. ASTM E 136 - Behavior of Materials in a Vertical Tube Furnace at 750ºC.
9. ASTM E 154 - Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
10. ASTM E 1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
11. ASTM E 1745 - Plastic Vapor Retarders Used in Contact with Soil or Granular fill under Concrete Slabs
12. ASTM E 84 - Surface Burning Characteristics of Building Materials.
13. ASTM E 96 - Water Vapor Transmission of Materials.

B. General References The following reference materials are hereby made a part of this Section by reference thereto:

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1. ACI 302.1R Vapor Barrier Component (plastic membrane) is not less than 10 mils thick.
2. NFPA 701 - Fire Tests for Flame Resistant Textiles and Films
3. All applicable federal, state and municipal codes, laws and regulations for thermal insulation and vapor barriers.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

B. Sequencing: Coordinate work of this section with related work.

1.5 SUBMITTALS

A. Information and Review Submittals:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
2. Manufacturer’s Instructions: Manufacturer’s installation instructions for placement, seaming and pipe boot installation.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Obtain products required for the Work of this Section for each type of vapor retarder shall be from a single manufacturer, and the related accessories as recommended by the prime manufacturer of the vapor retarder.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
2. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage and Handling Requirements:

1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
2. Store materials under cover and in manner to keep them dry, protected from weather, direct sunlight and damage from construction traffic and other causes.

PART 2 - PRODUCTS

2.1 UNDER SLAB VAPOR BARRIERS

A. Reinforced vapor barrier: 3 ply high density polyethylene laminated to a non-woven diamond pattern nylon yarn grid having no less than 48 yarns per square foot suspended in a permanently flexible medium. Equal to Reef Industries Inc., Houston TX., product "Griffolyn T-65 vapor barrier".

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1. Water Vapor Transmission Rate (WVTR) of not more than 0.050 grams per 100 square inches per 24 hours (tested per ASTM E96).
2. Puncture Propagation Tear (PPT) strength (of yarn grid): at least 15.0 pounds (tested per ASTM D2582).
3. Puncture strength (of vapor barrier): at least 24.5 pounds (tested per ASTM D4833).

2.2 ACCESSORIES

A. General: Staples, tape, adhesives and fasteners required for the proper and complete installation for work of this Section shall be as recommended by each respective manufacturers of each type of vapor barrier.

B. Air seal boot: PVC or EDPM premolded pipe and seal for penetrations at ceiling vapor barrier.

C. Seam Tape: High Density Polyethylene Tape or HDPE Tape as recommended by vapor barrier manufacturer, with pressure sensitive adhesive. Minimum width 4 inches.

D. Pipe Boots: Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by Architect.

B. Level and tamp or roll aggregate, sand or tamped earth base.

3.2 INSTALLATION - BELOW-SLAB VAPOR BARRIERS/RETARDERS

A. General: Install Vapor Barrier in accordance with manufacturer's instructions and ASTM E 1643–98. Place vapor barrier beneath all floor slabs

B. Unroll Vapor Barrier with the longest dimension parallel with the direction of the pour.

C. Lap Vapor Barrier over footings and seal to foundation walls.

D. Overlap joints a minimum of six inches with top lap in direction of spreading concrete. Turn up double layer at slab edges abutting walls. Seal with manufacturer's tape.

E. Seal all penetrations (including pipes, reinforcing steel, and permanent utilities) with manufacturer's pipe boot or vapor barriers recommended detail.

F. Do not puncture vapor barrier. No punctures or unsealed penetrations are permitted.

G. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.

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SECTION 078400

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install fireproof firestopping, firesafing materials, smoke seals and related accessories required for this Project for all penetrations through fire resistance rated construction, including, but not limited to, penetrations for plumbing, fire suppression, heating, ventilating and air conditioning, electrical systems, and specialized equipment.

1. Fire resistance rated construction requiring firestopping includes, but is not limited to: rated partitions, smoke barriers, smoke partitions, partitions in rated corridors, passageways and stairs, shaft partitions, shaft wall (vertical and horizontal), area separation fire walls, party wall systems, and temporary fire resistant rated partitions and barriers.

2. Provide removable temporary firestopping (pillows) as required to maintain fire integrity prior to Owner's final acceptance, to permit installation of electrical, telephone, data and sound system wiring. Replace temporary firestopping with permanent, after wiring systems are completed.

B. Furnish and install firestopping/smoke seals at construction joints occurring at tops of fire resistance rated partitions, smoke partitions, and temporary partitions between top of partition and underside of deck above.

C. Furnish and install all firestopping, firesafing, and smoke seals at perimeter of floor/roof construction and exterior wall systems, as indicated and where required by applicable codes.

D. Furnish and install all firestopping, firesafing, and smoke seals at expansion joints in chase walls where expansion joints are not exposed to view.

E. Furnish and install all firestopping, firesafing, and smoke seals where required by applicable codes and as additionally required by authorities having jurisdiction at no additional cost to the Owner.

1.2 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 – ADMINISTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, and physical properties.
   a. Indicate requirements for manufacturer's descriptive data for products and related materials with FM, UL or Warnock-Hersey illustrations showing systems and approval of materials in systems.

2. Certificates: Manufacturer's written certification stating that firestopping materials, meet or exceed the requirements specified under this Section and that all fire-resistive requirements for the indicated combustibility, Flame (F-rating) and Temperature (T-rating) Ratings have been met.

3. Manufacturer's installation instructions.

4. Test reports: Submit fire test reports from recognized, independent testing agent(s) indicating the following:
   a. Fire test report of firestop material applied to substrate and penetration materials similar to project conditions. Tests to indicate both Flame (F-rating) and Temperature (T-rating) Ratings.
   b. Test reports of products to be used shall indicate conformance to ASTM E-814.

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c. Include test report for each type and quantity of penetrant through each type of wall or floor construction.

5. On-site sample installation to be included in Work: Minimum (15) fifteen days prior to application in any area, provide samples of firestop and smokeseal materials and installation in accordance with the following requirements.
   a. Apply one sample of appropriate firestop and smokeseal material for each different penetration and fire rating required for the work.
   b. Sample areas will comply with thickness, fire resistance ratings, and finished appearance of the project and applicable fire code.
   c. Acceptance samples will constitute standard of acceptance for method of application, thickness, and finished appearance for firestop and smokeseal application. The sample(s) shall remain visible during completion of the work and shall remain as part of the completed work.

6. Shop drawings indicating requirements for penetrations in wall/deck intersections, change of planes, control joints, expansion joints and blank openings.

1.3 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

1.4 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Obtain firestop and smokeseal products from a single manufacturer, except as otherwise approved by the Architect.

C. Environmental Requirements for Volatile Chemicals: Use firestopping caulks that comply with the following limits for VOC content:
   1. Firestopping caulks: VOC not more than 250 g/L.

D. Special Inspections by Owners on-call Firestopping Installer: Allow for 3 percent of each type of firestopping system to be removed and inspected for conformance with approved submittals.
   1. All firestopping shall be inspected and approved by Owners Project Manager prior to installation of suspended ceilings or concealed by other materials.

E. Qualifications:
   1. Installer: a specialized subcontractor having not less than 3 years documented experience demonstrating previously successful work of the type specified herein.
      a. The manufacturer of the firestop material shall submit written certification that the firm to be used for the firestop products has been trained in the application of the products by the manufacturer.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire resistance ratings and surface burning characteristics.

B. Obtain certificate of compliance from authority having jurisdiction indicating approval of combustibility.

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2.2 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering similar products include the following, or approved equal:

1. Specified Technologies, Inc., Somerville, NJ.
   a. No other substitutions will be accepted.

2.3 MATERIALS

A. Firestop mortar; asbestos free, cementitious mortar, U.L. classified as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM/UL1479:

1. Acceptable product:
   a. Specified Technologies, Inc., product “Spec Seal Mortar”.

B. Silicone Firestop sealant; single component, non-combustible silicone elastomer firestop sealant, U.L. classified as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479. Sealants will not dissolve in water:

1. Acceptable product:
   a. Specified Technologies, Inc., product “Spec Seal Pensil 300 Sealant (gun grade)” or “Spec Seal Pensil 300SL" (Self Leveling).

C. Intumescent firestop sealant and caulks; acrylic based, water resistant sealant, which will not re-emulsify after drying:

1. Acceptable product:
   a. Specified Technologies, Inc., product “Spec Seal Triple-S Sealant".

D. Firestop putty; sticks or pads:

1. Acceptable product:
   a. Specified Technologies, Inc., product “Spec Seal Putty Bars and Pads”.

E. Firestop collars; pre-manufactured fire protective pipe sleeve, UL classified as "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479:

1. Provide separated (two piece) firestop collar for application when plastic pipe system is already in place. Provide non-separated firestop collar for application prior to installation of plastic pipe system.
2. Acceptable product:
   a. Specified Technologies, Inc., product “Spec Seal Collars”.

F. Firestop pillows; UL Classified as "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479:

1. Acceptable products, or approved equal:
   a. Specified Technologies, Inc., product “Spec Seal Pillows”.

G. Wrap strips:

1. Acceptable product:
   a. Specified Technologies, Inc., product “Spec Seal Wrap Strip”.

H. Elastomeric Firestopping; non halogenated latex based elastomeric coating applied by airless spray:

1. Acceptable product:
   a. Specified Technologies, Inc., product “Spec Seal Elastomeric Firestop Spray”.

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2.4 FIRESAFING

A. Mineral wool fiber / ceramic wool non-combustible insulation (fire safing); conforming to ASTM C665, Type 1, ASTM C612, and ASTM C553 with a minimum density of 4 pounds per cubic foot:

1. Flame Spread Classification: Material shall be classified non-combustible per ASTM E-814.
2. Recycled content of slag; use maximum available percentage of material (slag). Mineral wool insulation products incorporated into the work shall contain not less than 75 percent of recycled material (slag) by weight:
3. Acceptable products include:
   a. Fibrex Insulations Inc. Sarnia Ontario, Canada, product: “Fibrex FBX” Industrial board.
   b. Rock Wool Manufacturing Company, Leeds, AL, product: “Delta Safing Mineral Wool”.
   c. Roxul, Inc., product “Roxul Safe”.
   d. Thermafiber, Inc. product “Safing 4.0 pcf”.
4. Accessories: Provide galvanized steel safing clips as required for installation of insulation.

2.5 ACCESSORIES

A. Forming and damming materials: Mineral fiberboard or other type as recommended by firestopping manufacturer.

B. Primer, sealant and solvents: As recommended by manufacturer.

C. Woven wire mesh: Galvanized 20 gage woven wire mesh “chicken wire” or “poultry fencing”, 1 inch spacing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Installation of firestops shall be performed by applicators/installers qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations. Meet building code requirements.
3. Coordinate with plumbing, mechanical, electrical, and other trades to assure that all pipe, conduit, cable, and other items which penetrate fire rated construction have been permanently installed prior to installation of firestops. Schedule and sequence the work to assure that partitions and other construction which would conceal penetrations are not erected prior to the installation of firestops.
   a. Ensure that all firestopping is inspected prior to installation of suspended ceilings or concealed by other finished materials.

B. Dam construction:

1. Install dams when required to properly contain firestopping materials within openings and as required to achieve required fire resistance rating. Combustible damming material must be removed after appropriate curing. Incombustible damming material may be left as a permanent component of the firestop system.
2. Placement of dams shall not interfere with function or adversely affect the appearance of adjacent construction.

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C. Installation of single component silicone firestop:
   1. Apply with manual or powered caulking gun.
   2. Apply minimum 1/2 inch thickness for 2 hour rating. Apply 1/2 inch to both sides of wall penetrations.
   3. Use incombustible insulation as required to achieve fire resistance rating.
   4. Surface of gun grade silicone firestop may be tooled using clean, potable water.
   5. Clean excess material off of adjacent surfaces and tools within 10 minutes using either water or Xylol where the use of such would not be hazardous.

D. Installation of cementitious firestop mortar:
   1. Add dry powder to water and mix with mechanical mixer or hand mixing tools as recommended by firestop mortar manufacturer. Allow a average mixing time is 3 minutes and provide a average wet density of 70 pounds per cubic foot, plus or minus 5 PCF.
   2. Do not apply if ambient or substrate temperature is less than 35 degrees Fahrenheit during 24 hours after application.
   3. Wet all surfaces prior to application of firestop mortar.
   4. Mortar may be hand applied or pumped into the opening.
   5. Exposed surfaces shall be finished using conventional plastering tools prior to curing.
   6. When installation around layered cables, it is recommended to increase the fluidity of the firestop mortar to provide a better fill around the cables. Vibrate or move the cables slightly to prevent voids from forming between the cables.
   7. Allow 48 hours for initial cure prior to form removal. For full cure allow 27 days.
   8. Wet material may be cleaned with water. Dry material may require scraping or chipping.

E. Installation of firestop collars (plastic pipe only):
   1. Firestop collars may be surface mounted to a slab or wall or imbedded in Firestop Mortar to a maximum depth of 2 inches.
   2. For wall penetrations with ABS pipe firestop collars must be installed on both sides of the penetration to provide a 2 hour F and T Rating. All other applications required installation on one side only to provide a 2 hour F and T Rating.

F. Firesafing insulation: Install firestopping safing insulation on safing clips spaced as needed between each stud, leaving no voids. Secure safing clips to slab using fasteners recommended by insulation manufacturer. Install sealant over mineral wool in accordance with test requirements.

G. Conclusion of work day: Wherever work is performed in areas which abut or are adjacent to Owner occupied areas, at the conclusion of the work day ensure that all penetrations and perimeter construction joints are firestopped and that there are no openings, penetrations or construction joints left unprotected.

H. Firestopping for cabling shall use through wall or through floor adjustable fire rated pathway device similar to Specified Technologies, Inc. “EZ-PATH”.

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SECTION 079200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. General: The work of this Section consists of sealants and backing materials where shown on the Drawings, as specified herein, and as required for a complete and proper installation.

1. This Section specifies general requirements, definition of joint sealer types, and application requirements for sealant work specified within other individual specification sections.

B. Prepare sealant substrate surfaces, including removal of existing sealant and backing, and thorough cleaning of joints.

C. Furnish and install sealant and backing materials.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 061000 - ROUGH CARPENTRY.

E. Section 078400 - FIRESTOPPING: Firestopping sealants and related backing materials.

F. Section 092900 - GYPSUM BOARD: Application of concealed acoustical sealant used in conjunction with gypsum board work at abutting surfaces (perimeter of partitions and walls).

G. Section 099100 - PAINTING: Caulks used in preparation of applied finish coatings.

H. Section 017329 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.

I. Section 024119 - SELECTIVE DEMOLITION: Removal of existing finishes, partitions and walls as indicated in the Drawings

1.3 REFERENCES

A. The standards referenced herein are included to establish recognized quality only. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.

B. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM C 717 - Standard Terminology of Building Seals and Sealants.
2. ASTM C 790 - Guide for Use of Latex Sealants
3. ASTM C 804 - Use of Solvent-Release Type Sealants.
4. ASTM C 834 - Latex Sealing Compounds.
5. ASTM C 919 - Use of Sealants in Acoustical Applications.
6. ASTM C 920 - Elastomeric Joint Sealants.

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7. ASTM C 962 - Use of Elastomeric Joint Sealants.
8. ASTM C 1193 - Guide for Use of Joint Sealants.
9. ASTM C 1247 - Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.
10. ASTM D 1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
11. ASTM D 3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
12. FS TT-S-00227E - Sealing Compound: Elastomeric Type, Multi-Component.
13. FS TT-S-001543A - Sealing Compound, Silicone Rubber Base.
14. NSF /ANSI 61 – Drinking Water System Components – Health Effects.

C. The following reference materials are hereby made a part of this Section by reference thereto:

1. SWRI - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, chemical and physical properties and installation instructions for each item furnished hereunder.
2. Selection Samples: Sample card indicating Manufacturer's full range of colors available for selection by Architect.
3. Verification Samples: 12 inch long samples of sealant for verification of color, installed where directed by Architect.
4. Certificates: Manufacturer's certification that the Products supplied meet or exceed specified requirements.
5. Test and Evaluation Reports:
   a. Compatibility and adhesion test reports: Test reports from sealant manufacturer indicating that sealant proposed for use have been tested for compatibility and adhesion with actual samples of substrates to be used on this project. Include sealant manufacturer’s interpretation of test results, and recommendations for primers and substrate preparation specific to this Project.

B. Closeout Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

1. Bonds and Warranty Documentation: Manufacturer’s standard Warranties and Guarantees.

1.5 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Provide sealants from a single manufacturer for all work of this Section to the greatest extent possible. Each individual type of sealant installed in the Work shall be from a single manufacturer.

C. Qualifications:

1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.6 DELIVERY, STORAGE AND HANDLING

A. Each container and package must bear an unbroken seal, test number and label of the manufacturer upon delivery to the site. Failure to comply with these requirements shall be sufficient cause for rejection of the material in question, by the Architect and his requiring

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its removal from the site. New material conforming to said requirements, shall be promptl furnished at no additional cost to the Contract.

1.7 SITE CONDITIONS

A. Do not install single component solvent curing sealant in enclosed building spaces.

B. Environmental Requirements: Maintain temperature and humidity recommended by the sealant manufacturer during and 24 hours after installation. Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are below 40 degrees F.
2. When joint substrates are wet due to rain, frost, condensation, or other causes.

C. Do not proceed with installation of joint sealers until contaminates capable of interfering with their adhesion are removed from substrates.

1.8 WARRANTY

A. Provide 5 year warranty under provisions of Section 017800 - CLOSEOUT SUBMITTALS. Warranty shall include coverage of installed sealant and accessories which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Manufacturers and Products: To establish a standard of quality, design and function desired, Drawings and specifications have been based on the products specified, under this section for each individual sealant type, for the applications scheduled at the end of Section, and as may be additionally identified on the Drawings.

B. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. BASF Construction Chemicals (Sonneborn), Shakopee, MN.
2. Chem Link Inc., Schoolcraft, MI.
3. Dow Corning Corporation, Midland, MI.
4. Momentive Performance Materials (GE Silicones), Waterford, NY.
5. Pecora Corporation, Harleysville, PA.
6. Sika Corp, Lyndhurst, NJ.
7. STS Coatings, Inc., Comfort, TX.
8. Tremco, Inc., Beachwood, OH.
9. United States Gypsum Company (USG), Chicago, IL.
10. York Manufacturing, Inc., Sanford, ME.

2.2 SEALANT MATERIALS

A. Sealant Materials, General Requirements:

1. Only use sealant and primers that comply with the following limits for VOC content:
   a. Architectural Sealants: 250 g/L.
   b. Roofing Sealants: 420 g/L.
   c. Roadway Sealants: 250 g/L.
   d. Sealant primer: 250 g/L.
2. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.

B. Joint Sealer Type AA (Acrylic acoustical): One component acrylic latex, permanently elastic, non-staining, non-shrinking, non-migrating and paintable.

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1. Tremco, product “Tremco Acoustical Sealant”.
2. USG, product “USG Acoustical Sealant”.
3. Pecora, product “ AC-20 FTR”.

C. Joint Sealer Type AP (Acrylic painters caulk): One component acrylic latex caulking compound, conforming to FS 19-TP-21M and ASTM C 834 Type P, Grade NF, paintable within 24 hours after application, with a minimum movement capability of ±12.5 percent, equal to one of the following:

1. BASF (Sonneborn), product, “Sonolac”.
2. Tremco, product, “Tremflex 834”.
3. Bostik, product, “Chem-Calk 600”.
4. Pecora, product “ AC-20+”.

D. Joint Sealer Type P1 (Polyurethane 1-component): Low modulus single component gun-grade polyurethane sealant, non-sagging, conforming to FS TT-S-000230C, Type II, Class A, and ASTM C 920, Type S, Class 35, Grade NS, use NT,M, A and O with a minimum movement capability of ±35 percent, equal to the following:

1. BASF (Sonneborn), product “Sonolastic NP1”.
2. Sika, product “Sikaflex 1a”.
3. Tremco, product “Vulkem 116”, or “Dymonic FC”.

E. Joint Sealer Type P2 (Polyurethane, Multi-component): Low modulus type, Multi-component non-sagging gun-grade polyurethane sealant, conforming to FS TT-S-000227E, Type II, Class A, and ASTM C 920, Type M, Class 25, Grade NS, use NT,M, A and O with a minimum movement capability of ±25 percent, equal to the following:

1. BASF (Sonneborn), product “Sonolastic NP2”.
2. Tremco, product “Dymeric 240 / Dymeric 240FC”.
3. Pecora, product “Dynatrol II”.
4. Sika, product “Sikaflex 2CNS”.

F. Joint Sealer Type SC (Silicone, general construction): One-part medium modulus, natural cure, synthetic sealant, having a useful life expectancy of at least 20 years, conforming to ASTM C 920, Type S, NS, Class 25, use NT, G, A, M, O with a minimum movement capability of ±50 percent, equal to the following:

1. Dow Corning, product, “791”.
2. GE Silicones, product, “Silpruf”.
3. Pecora, product, “895”.
4. Sika, product, “Sika Sil-C 995”.
5. Tremco, product, “Spectrem 2”.

G. Joint Sealer Type SE (Silicone, Exterior construction): One-part low modulus, moisture curing, synthetic rubber sealant, having a useful life expectancy of at least 20 years, conforming to ASTM C 920, Type S, NS, Class 25, FS TT-S-001543A, Type, Class A with a minimum movement capability of +100 percent and -50 percent, equal to the following:

1. Dow Corning, product, “790”.
2. GE Silicones, product, “SCS9000 SilPruf NB”.
3. Sika, product “Sika Sil-C 990”.
4. Tremco, product “Spectrem 1”.

H. Joint Sealer Type SM (Silicone, Mildew-resistant): USDA approved one component acetoxy silicone rubber, mildew resistant, acceptable to local health officials, conforming to U.S. Food and Drug Administration regulation 21 CFR 177.2600, FS TT-S-001543A, Type Non-Sag, Class A, and FS TT-S-00230C, Type II, Class A and ASTM C 920, Type S, Class 25, Grade NS, use NT,G and A with a minimum movement capability of ±25 percent, and a Shore A hardness of 20, equal to the following:

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1. BASF (Sonneborn), product "OmniPlus".
2. Dow Corning, product "786".
3. GE Silicones, product "Sanitary 1700".
4. Tremco, product "Tremsil 200".
5. Pecora, product "898".

I. Joint Sealer Type SP (Silicone, Paintable all purpose): One-component, medium modulus, pre-pigmented, neutral cure elastomeric silicone sealant, or silyl-terminated polyether (hybrid) sealant, conforming to ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, and O. Paintable after manufacturer's recommended cure time.

1. BASF (Sonneborn), product "Sonolastic 150".
2. Dow Corning, product "756 SMS Building Sealant".
3. GE Silicones, product "Silicone II Paintable Sealant".

2.3 ACCESSORIES

A. Compressible joint bead back-up: Compressible closed cell polyethylene, extruded polyolefin or polyurethane foam rod complying with ASTM C 1330, Type C, 1/3 greater in diameter than width of joint. Shape and size of compressible back-up shall be as recommended by manufacturer for the specific condition used. Provide one of the following, or equal.

1. Construction Foam Products (Division of Nomaco, Inc.), Zebulon, NC, product "HBR Closed Cell".
2. Industrial Thermo Polymers Ltd., Brampton, Ontario CN, product "ITP Standard Backer Rod".
3. BASF Construction Chemicals (Sonneborn), Shakopee MN, product "Sonolastic Closed Cell Backer Rod".
4. W.R. Meadows Inc., Hampshire, IL, product "Sealtight Kool-Rod".

B. Primers: Furnish and install joint primers of the types, and to the extent, recommended by the respective sealant manufacturers for the specific joint materials and joint function.

C. Bond-breaker tape, and temporary masking tape: Of types as recommended by the manufacturer of the specific sealant and caulking material used at each application, and completely free from contaminants which would adversely affect the sealant and caulking materials.

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. Inspect existing joints to be renovated.

1. Verify joint sealants, backing, and other materials containing PCBs and other hazardous materials have been removed.
2. Verify joint substrates and adjoining materials are structurally sound.
3. Verify joints to be renovated can be satisfactorily repaired with specified methods and materials.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General:

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1. Weather conditions must be dry and of the temperature, as recommended by sealant manufacturer, during application operations.
2. Surface receiving work of this section must be absolutely dry and dust free. All joints receiving sealant/caulking materials and primers shall be subject to the approval of the sealant manufacturer for proper use of specified materials.

B. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials that will prevent proper adhesion of primers and sealant materials.
1. Clean ferrous metals of all rust and coatings by wire brush, grinding or sandblasting. Remove oil, grease and protective coatings with cleaners recommended by sealant manufacturer.
2. Where sealant is indicated to replace existing, thoroughly remove existing sealant and backing, scrape and clean surfaces. Renovate sealant joints in accordance with manufacturer's instructions and reviewed shop drawings. Remove all existing sealant residue from joint surfaces using chemical cleaners and solvents which are acceptable to sealant manufacturer.

C. Prime joint substrates, as recommended in writing by joint-sealant manufacturer, as based on preconstruction joint-sealant-substrate tests or as based upon 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.

D. Verify that joint backing and release tapes are compatible with sealant.

E. Perform preparation in accordance with ASTM C 804 and C 790 for solvent and latex base solvents, respectively.

3.3 PREPARATION FOR REPLACEMENT OF EXISTING SEALANT

A. Remove existing joint sealants and backing as shown on drawings and identified during pre-installation conference and inspection (Article 3.1 herein above). Do not remove silicone joints to be recapped and joints to be covered with silicone seals.

B. Cut existing sealant close to joint edges.

C. Clean joint with power or hand wire brush, grinding, saw cutting, or solvent cleaning to depth at which replacement backing and sealant are to be installed.

D. Blow out dust, loose particles, and debris with moisture and oil-free compressed air. Remove any pieces of caulk and backer rod lodged in joint.

E. Repair deteriorated or damaged substrates as recommended by sealant manufacturer to provide suitable substrate for new sealant. Allow patching materials to fully cure.

3.4 INSTALLATION

A. General: Conform to SWRI requirements, and sealant manufacturer's written requirements for installation.

B. Install joint bead back-up in all joints in excess of 5/8-inch depth, and joints that have no back-up therein, placing the joint bead in the joint in a manner that will assure a constant depth 1/8 inch greater than the sealant and caulking material depth tolerances.
1. Set beads into joints continuously, by slightly stretching during placement, to permit compression against sides of joint, without surface wrinkles or buckles.
2. Do not stretch back-up material into joints.

C. Install bond breaker in joints where shown in the Drawings and wherever recommended by the sealant manufacturer to prevent bond of the sealant to surfaces where such bond might impair the Work.

D. Apply masking tape or other precautions to prevent migration or spillage of materials onto adjoining surfaces.

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E. Apply urethane sealant and latex caulking materials into joints in accordance with manufacturer's instructions, using mechanical or power caulking gun equipped with nozzle of appropriate size, with sufficient pressure to completely fill the joints.

1. The depth of sealant and caulking materials shall be in accordance with manufacturer's recommendations for the specific joint function, but in no case exceed 1/2-inch in depth, nor less than 1/4-inch, regardless of the joint width.
2. Maintain the outer edge of the sealant and caulking materials, where side faces of joints are in the same plane, back 1/8-inch from the faces.
3. Apply sealant in continuous beads without open joints, voids or air pockets so as to provide a watertight and airtight seal for the entire joint length.
4. After placement of the sealant and caulking materials, concave-tool the surfaces to uniform density, using a water-wet tool. Do not use detergents or soapy water for the tooling operations.
5. Remove the temporary masking tape immediately after tooling, and before the sealant or caulking material has taken initial set.

3.5 CLEANING

A. Clean all surfaces of adjacent surfaces which have been marked or soiled by the work of this Section, removing all excess sealant and caulking materials with solvents which will not damage the surfaces in any way.

3.6 PROTECTION

A. During the operation of sealant work, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

3.7 SCHEDULE

A. General: Seal joints indicated and all interior and exterior joints, seams, and intersections between dissimilar materials.

B. Sealant Colors:

1. Colors for Sealant Types “P1”, “P2”, “SC”, “SE”, “SP” and “SM”: As selected by the Architect from manufacturer’s standard colors.
2. Color for Sealant Types “AA” and “AP”: White.
3. In concealed installation, and in partially or fully exposed installation where so approved by the Architect, standard gray or black sealant may be used.

C. Exterior joints (Listed by primary building material abutting sealant joints):

1. Exterior Metal:

Joint Condition	Sealant Type
a. Metal to metal:	P1 or SE

D. Exterior joints (Listed by primary building material abutting sealant joints):

2. Exterior Masonry:

Joint Condition	Sealant Type
a. Masonry to metal:	P2

E. Interior joints (Listed by primary building material abutting sealant joints):

1. Gypsum Board:

Joint Condition	Sealant Type
a. Gypsum board to metal or wood trim:	AP or SP
b. Gypsum board to abutting surfaces at exposed tops and bottoms partitions and walls:	AA
c. Gypsum board to masonry:	SC

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d.	Gypsum board to interior door and window frames, penetrating conduits and piping, light-fixtures, electrical cover plates, building specialty items, ductwork, grilles, supply diffusers, faucets, piping, escutcheon plates and similar items:	AP or SP
e.	Gypsum board to plumbing fixtures:	SM

2. Architectural millwork and casework:

Joint Condition		Sealant Type
a.	Casework to abutting materials, kitchens, toilet rooms and similar “wet spaces”:	SM
b.	Casework to abutting surfaces (except in “wet” spaces):	AP or SP
c.	Countertops to abutting wall surfaces and to abutting casework:	SM
d.	Countertops to plumbing fixtures and fittings:	SM

3. Interior metal:

Joint Condition		Sealant Type
a.	Metal to metal:	SC

4. Interior floor drains:

Joint Condition		Sealant Type
a.	Floor drains to concrete slab:	SE
b.	Floor drains to resilient sheet flooring:	SE

5. Acoustical ceilings:

Joint Condition		Sealant Type
a.	Acoustical ceiling edge angle to irregular wall surface	AP or SP

6. Interior Wood:

Joint Condition		Sealant Type
a.	Wood to wood (natural or stained finishes)	SC or SP
b.	Wood to wood (painted opaque finishes)	AP or SC or SP
c.	Wood to metal	SC or SP

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SECTION 081113

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install the following products to be installed under the designated Sections:

B. Furnish the following products to be installed under the designated Sections:

1. Flush UL-Labeled and non-labeled steel doors, complete with internal reinforcing, hardware cut-outs; and provided with glazing openings, where so indicated; installed by Section 062000 - FINISH CARPENTRY.

2. Hollow metal frames for doors, UL-Labeled and non-labeled, complete with internal reinforcing; installed under Section 061000 - ROUGH CARPENTRY.

3. Glazing beads, loosely attached to hollow metal frames and doors, where so indicated, for removal and permanent installation during glazing operations; installed by: Section 088000 - GLAZING.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 061000 - ROUGH CARPENTRY:

1. Wood blocking, and nailers.

2. Installation of hollow metal door frames.

3. Placement and temporary bracing of hollow metal frames built-into masonry.

E. Section 062000 - FINISH CARPENTRY: Installation of doors and hardware.

F. Section 079200 - JOINT SEALANTS: Requirements for sealants and backing materials.

G. Section 081416 - FLUSH WOOD DOORS: Furnishing wood doors to be installed in hollow metal frames.

H. Section 087100 - DOOR HARDWARE: Furnishing finish hardware, and installation templates for hardware cut-outs and reinforcing.

I. Section 088000 - GLAZING: Furnishing and installing glass located in doors and frames.

J. Section 092900 - GYPSUM BOARD: Gypsum grout fill for hollow metal frames occurring in gypsum drywall assemblies.

K. Section 099100 - PAINTING: Applied finish coatings.

L. Building-in of frame anchors to wall and partition construction: By trade responsible for wall and partition erection.

1.3 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 – ADMINISTRATION REQUIREMENTS:

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1. Product Data: Manufacturer's product data sheets, specifications, for doors, frames and shop applied finishes.
2. Shop Drawings:
   a. Door and Frame Schedule: A complete schedule coordinated with, and using same identifier designations as, the door and frame schedule contained in the Contract Drawings.
   b. Large scale details of each type door and frame construction, indicating all gauges, reinforcing, and anchorage.
      1) Indicate cutouts for louvers.
3. Certificates: Manufacturer's written certification stating that doors, frames, and all related items to be furnished hereunder, meet or exceed the requirements specified under this Section; that specified galvanized and shop priming has been performed; and that all U.L. fire-resistive requirements for the indicated Labels have been met.

B. Closeout Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS.
   1. Bonds and Warranty Documentation: Manufacturer’s standard warranty.

1.4 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Obtain doors and frames specified in this Section from a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on Pioneer Industries, Carlstadt, NJ, as distributed through DTI Supply Co, Greenland, NH, http://www.pioneerindustries.com/distributors/nh.

B. Acceptable manufacturers for metal frames and doors: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
   1. Pioneer Industries, Carlstadt, NJ, as distributed through DTI Supply Co, Greenland, NH
   2. Amweld Building Products, Inc., (A Division of Amweld International, LLC), Coppell, TX.
   3. Ceco Door Products (A Division of Assa Abloy Group Company), Milan, TN.
   4. Curries Company (A Division of Assa Abloy Group Company), Mason City, IA.
   5. Republic Doors and Frames, McKenzie, TN.
   6. Steelcraft (A Division of Ingersoll-Rand Company), Cincinnati, OH.

2.2 DESCRIPTION

A. Regulatory Requirements:
   1. Fire rated door construction shall conform to UL publications 10B and 10C.
   2. Install fire rated door assemblies in compliance with NFPA 80.

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3. Corridor door assemblies shall be tested and listed per UL 1784.

2.3 DOORS

A. General: Refer to the Drawings for design of doors, sizes, glazing cut-outs in doors, and details.

B. Construction: Full flush commercial type, 1-3/4 inches thick, unless noted otherwise, meeting or exceeding the materials, gauges, construction, and testing requirements of the referenced ANSI and SDI publications.

1. Exterior Door Core Construction: Manufacturer's standard polystyrene core, or polyurethane core (at non-rated doors only). Fabricate exterior doors with specified R-value when tested according to ASTM C1363.

a. Exterior Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

2. Interior Door Core Construction: Manufacturer's standard 99-pound (basis weight) kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

a. Interior Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

C. Exterior Doors: ANSI 250.8, Level 4, Model 2 (Seamless), ANSI A250.4 Physical Performance Level A, (Maximum Duty) having 14-gauge, 0.071 inch thick (1.78 mm) A60 galvannealed steel faces, with a minimum core R-value of 6.25.

1. Visible edge seams: Epoxy fill edge seams and finish for seamless appearance (Model 2).

D. Interior Doors 1-3/8 inch thick (34.9 mm): ANSI 250.8, Level 1, Model 1 (Full Flush), ANSI A250.4 Physical Performance Level C, (Standard Duty) having 20-gauge, 0.032 inch thick (0.8 mm) steel faces, with a minimum STC rating of 32.

E. Hardware reinforcing: Welded in place steel reinforcement, hot rolled pickled and oiled steel per ASTM A569. Reinforcing shall be not less than the following minimum steel thicknesses:

1. Hinges: 7 gauge, minimum 0.167 inch (4.2 mm) thick.

2. Closers: Box/channel-shape reinforcing, 12 gauge, minimum 0.093 inch (2.3 mm) thick.

3. Closers: Box/channel-shape reinforcing, 14 gauge, minimum 0.067 inch (1.6 mm) thick.

4. Locks: Box/channel-shape reinforcing,

a. Cylindrical locks: 16 gauge, minimum 0.053 inch (1.3 mm) thick.

b. Mortise locks: 14 gauge, minimum 0.067 inch (1.6 mm) thick.

5. Kick plates: 18 gauge, minimum 0.042 inch (1.0 mm) thick.

6. All other hardware: 14 gauge, minimum 0.067 inch (1.6 mm) thick.

7. Locations for reinforcing shall be determined from information and templates provided under Section 08 71 00 - DOOR HARDWARE.

F. Fabrication:

1. Fabricate exposed faces of door panels from cold-rolled steel only.

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2. Fabricate concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel (at manufacturer's option).
3. Fabricate doors with hardware reinforcement welded in place.
4. Attach fire rated label to each door unit.
5. Close top and bottom edge of exterior doors with flush end closure. Seal joints watertight.

2.4 HOLLOW METAL FRAMES

A. General: Refer to the Drawings for various types of frames, sizes, and profiles, UL fire-resistive Label frames, and other characteristics of frames and related items.

1. Frame type, (non-- rated frames and fire-resistance rated frames): Knock-down slip-on type frames with hairline mitered joints and concealed clip reinforcement.

B. Materials for frames, reinforcement, anchors, anchor clips and related items: commercial grade cold-rolled steel conforming to ASTM A109 or commercial grade hot-rolled and pickled steel conforming to ASTM A415.

1. Frame gauges:
   a. Exterior frames: Thermally broken, 12-gauge, 0.093 inch thick (2.3 mm), with an A60 zinc coating supplied by the hot-dip process conforming to ASTM A653, Grade 37, with coating applied in accordance with A 924.
   b. Interior frames: 16-gauge, 0.053 inch thick (1.3 mm).
   c. Interior frames for openings wider than 4 feet and doors required for specific U.L. Label shall be fabricated from 14 gauge steel except as otherwise required for specific U.L. Label.
2. Hinge reinforcement: 7 gauge, minimum 0.167 inch (4.2 mm) thick.
3. Door closer reinforcement: 12 gauge, minimum 0.093 inch (2.3 mm) thick.
4. Floor clips: 16 gauge, minimum 0.053 inch (1.3 mm) thick.
5. Splice plates or channels: same gauge as door frame.
6. Plaster guards: 26 gauge, minimum 0.016 inch (0.4 mm) thick.
7. Dust cover boxes: 26 gauge, minimum 0.016 inch (0.4 mm) thick.
8. Frames shall be equal-rabbet style, to allow door swing to be changed without frame removal.

C. Frame construction:

1. Fire-rated frame assemblies: Modify specified construction to meet all construction requirements required for fire-resistive rating.
   a. Affix appropriate UL, FM or Warnock Hersey labels to each rated frame assembly, indicating applicable rating.
2. Shop-fabricate frames as whole single units per door opening, except when frame size is too large to ship as a single unit. Oversized frames may be shipped in large sections as practicable for field assembly with concealed splice plates or channels.
   a. Frame corner construction: Refer to paragraph A of this Article.
3. Reinforcements, stiffeners, and base angle clips: Welded to interior surfaces of frames to provide a stable base and so as to not interfere with installation of hardware.

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4. Provide plaster guards, welded to frame, at back of hardware cut-outs where mortar or other materials may obstruct hardware operation.
5. Provide dust cover boxes, welded to frame, at back of hardware cut-outs where joint compound or other materials may obstruct hardware operation.
6. Appearance of finished frames: Strong, rigid, completely free from warp and buckle, with miters well-formed and in true alignment, and with surfaces smooth and free from defects of any kind.
7. Silencer holes: Prepare frames for silencers at non-gasketed doors. Provide three single silencers for single doors, and mullions of double doors on strike side. Provide two single silencers on frame head at double doors without mullions.

D. Anchorage:

1. Anchor clips for frames in metal stud partitions: 16-gauge (minimum 0.053 inch [1.3 mm] thick) steel z-shaped clips factory welded onto frame, 1-1/2 inch upturned and downturned legs, or equivalent type standard with the manufacturer, contained within the frames, for screw attachment to metal studs under Section 092216 - NON-STRUCTURAL METAL FRAMING.
2. Anchors for fire-resistive rated frames: Conform to all UL requirements for the specific fire-resistive ratings.
3. Provide the following number of anchors, clips, or bolts, per jamb:
   a. For frames 7’-6” in height or less: 3 anchors per jamb.
   b. For frames 7’-6” in height or less and having doors exceeding 3’-0” feet width, and for cross corridor frames: 4 anchors per jamb.
   c. For frames greater than 7’-6”, up to 10’-0” in height: 4 anchors per jamb.
   d. For frames greater than 7’-6”, up to 10’-0” in height, and having doors exceeding 3’-0” feet width, and for cross corridor frames: 5 anchors per jamb.
   e. For frames over 10’-0’ in height: 5 anchors per jamb.

2.5 FABRICATION

A. General: Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Architect.

B. Fabrication Tolerances, Maximum variation for doors and frames: Maximum diagonal distortion 1/16 inch measured with straight edge, corner to corner.

C. Frames shall be fabricated with full drywall returns.

D. Do not provide hospital stops unless specifically requested, these are not used at this facility.

2.6 FINISHES

A. Preparation: Pressure-sand all surfaces of all doors, frames, accessory items, anchors, and related items, to remove blemishes and foreign matter and provide paint grip. Spot-fill imperfections with metallic filler, and sand smooth. Thoroughly clean the surfaces by applying hot or cold phosphate treatment standard with the manufacturer.

B. Following cleaning apply one dip or spray coat of rust-inhibitive metallic oxide, zinc chromate, or synthetic resin primer to all surfaces, including those which will be concealed after erection. Bake, or oven dry, the primer at time and temperature recommended by the manufacturer for developing maximum hardness and resistance to abrasion.

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2.7 ACCESSORIES

A. Removable Stops: Rolled steel channel shape.

B. Astragals for Double Doors: Steel T shaped.

C. Primer: ANSI A250.10 rust inhibitive type.

D. Weather-stripping, as provided by the manufacturer.

PART 3 - EXECUTION

3.1 ERECTION AND INSTALLATION

A. Installation of frames and doors, including all accessories and related items furnished hereunder, will be performed under Section 061000 - ROUGH CARPENTRY, and Section 062000 - FINISH CARPENTRY.

B. Fabricate, install and adjust weather-stripping so that it provides an air tight and continuous seal, without daylight visible from the interior on all (4) sides.

C. Final installation of loosely-attached glazing stops will be performed under Section 088000 - GLAZING.

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SECTION 081416

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish the following products to be installed under the designated Sections:

1. Flush solid core wood doors, complete with necessary blocking, hardware cut-outs; and provided with openings for glazing where so indicated, for installation under: Section 062000 - FINISH CARPENTRY.
2. Wood glazing beads, loosely attached to glazing cut-outs in doors for removal and permanent installation under: Section 088000 - GLAZING.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

1.3 SUBMITTALS

A. Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

1. Literature: Fabricator's product data sheets, specifications, and performance data.
2. Certificates: Wood products lacking acceptable documentation for the following will be rejected and their removal required.
   a. General: Fabricator's written certification stating that doors, meet or exceed the requirements specified under this Section; that specified shop finishing has been performed; and that all fire-resistive requirements for the indicated Labels have been met.
   b. Provide signed certification by agent of door manufacturer stating that machining, glazing and finishing of doors shall be performed by only by the manufacturer in its facilities.
   c. Composite Wood and Agrifiber Products: Include certification indicating compliance 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, including 2004 Addenda for all composite wood and agrifiber products.
3. Door schedule: All doors specified under this Section, coordinated with the schedule contained in the Contract Drawings.
   a. Indicate doors to be factory finished and finish requirements.
   b. Indicate fire protection ratings for fire rated doors.
4. Shop drawings: Elevations, and large scale sections and details of door construction, indicating profiles, core construction, joinery, edges, and cut-outs for hardware and glazing.
   a. Indicate dimensions and locations of mortises and holes for hardware.
   b. Indicate dimensions and locations of cutouts.
   c. Indicate requirements for veneer matching.

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5. Verification samples:
   a. Corner section of specified flush type door, showing core construction and joinery.
   b. For transparent finishes: submit two 8 by 10 inch mounted finished samples of each species of veneer specified.
   c. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.4 QUALITY ASSURANCE

A. All materials and workmanship shall conform in all respects to the specified grades of the Window and Door Manufacturer's Association (WDMA) Industry Standard IS 1-A-97, except as modified herein.

1.5 WARRANTY

A. Provide the following warranties under provisions of Section 017800 - CLOSEOUT SUBMITTALS. Warranties shall include delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction, all as defined by AWI Quality Standards.
   1. Warranty length: Interior doors: Manufacturer's lifetime warranty.
   2. Warranty coverage shall include all labor and material costs of delivery, re-hanging, re-finishing, glass and glazing to produce a complete installation of replaced or repaired doors.

PART 2 - PRODUCTS

2.1 FLUSH FACED DOORS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
   1. Algoma Hardwoods, Inc., Algoma, WI.
   2. Marshfield DoorSystems™, Inc., Marshfield, WI.
   3. Eggers Industries, Architectural Door Division, Two Rivers, WI.
   4. Lambton Doors, Lambton Quebec, Canada.
   5. Oshkosh Door Company, Oshkosh, WI.
   6. VT Industries Inc., Holstein, IA.

B. General requirements: Conform to the requirements set forth in the designated Sections of the (WDMA) Industry Standard IS 1-A-97, and the applicable requirements of U.S. Commercial Standard CS 171, as amended. Refer to the Drawings for sizes, locations of each type door, glazing cut-outs in doors, and other characteristics of doors to be furnished hereunder.
   1. Door Grade: Premium.
   2. Door Facing:
      a. Face veneer: WDMA Industry Standard, "A' Grade veneer minimum 1/50 inch (0.6 mm) thick, mechanically sliced. Wood species shall be White Oak (Quercus alba), plain sliced with book matched grain.
      b. Crossbanding: Hardwood veneer or composite product at least 1/16 inch thick.

C. Acoustical seals shall be provided at all (4) edges of doors, as noted in the Door Schedule.

2.2 FIRE-RESISTANCE RATED 45, 60 AND 90 MINUTE LABEL DOORS

A. General Construction: WDMA Industry Standard I.S. 1-A-97, S-21 Veneer, Fire Rated Mineral Core, Premium Grade Door.
   1. Door thickness: 1-3/4 inches, unless indicated otherwise.

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2. WDMA Specification Descriptions.
   a. 90 minute “B” label doors: Type“FD-90 MIN-5, HPDL”.
   b. 60 minute label doors: Type“FD-60 MIN-5, HPDL”.
   c. 45 minute “C” label doors: Type“FD-45 MIN-5, HPDL”.

B. Door facing: As specified herein above under Article – “Flush Faced Doors”.

C. Core construction:
   1. Core: Non-combustible mineral sections.
   2. Stiles: multiple-ply stiles with 1/4 inch solid hardwood outer ply matching face veneers for species and color.
   3. Top and bottom rails: Maple, birch, Structural Composite Lumber (SCL) or UL approved composite material to meet label requirements.
   4. Blocking: Provide blocking as required to meet WDMA Extra Heavy Duty performance for securing surface applied hardware without the use of through bolts.
      a. For doors scheduled to receive screw-mounted surface closers, provide top rail blocking.
      b. For doors scheduled to receive surface mounted fire exit devices or vertical rods, provide top, intermediate and bottom rail blocking for screw mounting.
      c. Provide additional blocking for all other surface mounted hardware.

D. Adhesives:
   1. Face assembly: Type 1 (waterproof).
   2. Core assembly: Type II (water resistant).

2.3 NON-RATED SOLID-CORE DOORS

A. General Construction: WDMA Industry Standard I.S. 1-A-97, S-9 Veneer, Particleboard Core Bonded, Premium Grade Door.
   1. WDMA Specification Description: “PC-5”.
   2. Door thickness: 1-3/4 inches, unless indicated otherwise.

B. Door facing: As specified herein above under Article – “Flush Faced Doors”.

C. Core construction:
   1. Core: Particleboard complying with ANSI A208.1 Type 1, Grade 1-LD-2 having a density of 33 pounds per cubic foot.
      a. Provide only formaldehyde free particleboard, equal to Rodman Industries, Oconomowoc, WI. Furnish certification of formaldehyde free products.
   2. Stiles: Laminated strand lumber or hardwood mill option for inner ply of styles, continuously bonded to core with adhesives and abrasively planed before veneering, minimum of 1-3/8 inches after trimming, with 1/4 inch solid hardwood outer ply matching face veneer, or visually compatible hardwood species.
   3. Top and bottom rails: Maple, Birch, Structural Composite Lumber (SCL) or UL approved composite material to meet label requirements, minimum 1-1/8 inch width.

D. Adhesives: Type 1 (waterproof) for both face and core assembly.

2.4 GLAZING BEADS

A. Glazing beads for “B” and “C” fire rated doors, wood veneered bead:
   1. Algoma’s style number W-9, labeled, with 1/2 inch sight line.
   2. Eggers #100 style.
   3. Marshfield DoorSystems veneer clad light bead.
   4. V-T type VT1F.

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B. Glazing beads for 20 minute non-fire rated doors:
   1. Algoma's style number W-4 wood bead with 3/8 inch sight line.
   2. Eggers style number 100, 5/8 inch sight line.
   3. Marshfield DoorSystems style number W-6, 3/8 inch sight line.

2.5 FABRICATION

A. Fabricate doors in accordance with specified manufacturer's requirements. Fabricated rated doors in compliance with WHI, or UL requirements as appropriate.

B. Laminate door facing, cross banding and assembled core in a hot press.

C. Bond stiles and rails to cores, sand for uniform thickness. Factory sand assembled door leaf.

D. Factory-machine doors to receive hardware from templates furnished under Section 087100 - DOOR HARDWARE, or as indicated on the Drawings. Do not machine for surface hardware.
   1. Provide inner blocks at lock edge and top of door for closer hardware reinforcement.

E. Factory fabricate doors for undercut where scheduled.

F. Factory cut all glazed openings as scheduled. Field cutting of openings is prohibited.

G. Fabrication tolerances: Maximum diagonal distortion (warp): 1/4 inch (6 mm) measured with straight edge from corner to corner over a maximum 42 by 84 inch surface area.

2.6 FACTORY FINISHING

A. General: Factory finish to be to comply with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations.

B. Transparent finish: AWI Premium Grade Factory Finish System 9, having ultraviolet (UV) cured polyurethane sealer and topcoat, with a satin sheen of 31° to 35° gloss units per ASTM D523.
   1. Finish system shall include the following:
      a. Finish sanding.
      b. Sealer application - first coat.
      c. Sealer gel cure.
      d. Sealer application - second coat.
      e. Sealer gel cure.
      f. Sealer application - third coat.
      g. Sealer full cure.
      h. Sealer sanding.
      i. Topcoat application - first coat.
      j. Topcoat application - second coat.
      k. Topcoat full cure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of wood doors, including all accessories and related items furnished hereunder, will be performed under Section 062000 - FINISH CARPENTRY.

B. Final installation of loosely-attached glazing stops will be performed under Section 088000 - GLAZING.

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SECTION 083100

ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Fire resistive rated and non-rated access panels and frames, as specified under this Section, furnished by Sections requiring the same and installed under the following Sections:

1. Section 092900 - GYPSUM BOARD: Installation of access panels into drywall assemblies.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 092900 - GYPSUM BOARD: Installation of access panels into drywall assemblies.

E. Division 21 - FIRE SUPPRESSION: Furnishing access panels required for fire protection systems.

F. Division 22 - PLUMBING: Furnishing access panels required for plumbing systems.

G. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Furnishing access panels required for heating/cooling systems.

H. Division 26 - ELECTRICAL: Furnishing access panels required for electrical systems.

1.3 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

B. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 –ADMINISTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's product data sheets, specifications and installation instructions.
2. Schedule: Submit Schedule of all access panels to be furnished hereunder, indicating locations for each size and type of access door.
   a. The Contractor is responsible to ensure that all of the types/styles of panels and frames specified herein can be furnished by the manufacturer submitted.
   b. Prior to submitting schedule, coordinate with the work of Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATING AND AIR CONDITIONING and Division 26 - ELECTRICAL and meet with the Architect to determine exact quantities and locations required for the installation of access panels.
3. Shop drawings: Large scale details of access doors, indicating all sizes, gages and thickness; provide complete installation details, coordinated to the specific receiving conditions.

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1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Conform to applicable code for fire rated access doors.

1. Provide access doors of fire rating equivalent to the fire rated assembly in which they are to be installed.

C. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE AND HANDLING

A. Do not deliver access doors to the site, until all specified submittals have been submitted to, and approved by, the Architect.

B. Store access door units inside, under cover, and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.

1.7 PROJECT CONDITIONS

A. Coordinate the work with other work requiring access doors.

B. Coordinate the work with the placement of support to receive anchor attachments.

C. Coordinate the work with installation of ceiling systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Acudor Products Inc., Cedar Grove, NJ
2. Karp Associates Inc., Maspeth NY.
3. Nystrom Products Company, Minneapolis MN.
4. Williams Brothers Corporation of America, Front Royal, VA.

B. Single Source: All work of this Section shall be produced by a single manufacturer, unless otherwise approved by the Architect.

2.2 ACCESS PANELS - FOR FIRE RESISTANCE RATED CONSTRUCTION

A. For fire-resistance rated wall and ceiling surfaces: Standard flush panel door meeting the following requirements:

1. Panel and frame rating: UL “B” label for 90 minutes.
2. Frame type:
   a. For gypsum board walls and ceilings: 16 gage galvanized bonderized steel frame, with 22 gage galvanized steel drywall bead.
      1) Acudor FW-5050DW
      2) Karp KRP-350FR series.
      3) Nystrom IW series.
      4) Williams WB-FR series.

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3. Door: Insulated Flush panel door as follows:
   a. Typical gypsum board walls and ceilings: Flush door, Sandwich construction with 2 inch thick mineral wool fiber insulation between two layers of 20 gage galvanized bonderized steel.
4. Hinge: Flush continuous piano hinge with stainless steel pin.
5. Closer: Spring closer.
6. Latch: Flush cam latch, operated by Allen or Torx head screwdriver.
7. Manufacturer's standard gasketing at all (4) sides.

2.3 ACCESS PANELS - FOR NON- RATED CONSTRUCTION

A. For non-rated wall and ceiling surfaces (service and non-public areas): Flush panel door type meeting the following requirements:
   1. For gypsum board walls and ceilings: 16 gage galvanized bonderized steel frame, with 22 gage galvanized steel drywall bead.
   2. Frame type:
      a. For gypsum board walls and ceilings: 16 gage galvanized bonderized steel frame, with 22 gage galvanized steel drywall bead.
         1) Acudor DW-5040 series.
         2) Karp KDW series.
         3) Nystrom NW series.
         4) Williams WB-PL series.
   3. Door: Flush panel door as follows:
      a. For gypsum board wall and ceilings: 14 gage galvanized bonderized steel.
   4. Hinge:
      a. Typical: Concealed spring hinge enabling door to open 175 degrees and permit removal of door from frame.
      b. Panels greater than 24 by 36 inches: Flush continuous piano hinge with stainless steel pin.
   5. Latch: Flush cam latch, operated by Allen or Torx head screwdriver.
   6. Manufacturer's standard gasketing at all (4) sides.

B. For non-rated gypsum board walls and ceilings (Public areas): Recessed door type meeting the following requirements
   1. Manufacturer's types:
      a. Acudor DW-5015 series.
      b. Karp:
         1) Walls: Karp RDW series.
         2) Ceilings: Karp KATR series.
      c. Nystrom RW series.
      d. Williams WB-DW series.
   2. Frame type: 16 gage galvanized bonderized steel frame, with 22 gage galvanized steel drywall bead.
   3. Door: Recessed 16 gage galvanized bonderized steel door. with 22 gage galvanized steel drywall bead.
   4. Hinge: Concealed pivot rod hinge.
   5. Latch: Flush cam latch, operated by Allen or Torx head screwdriver.

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2.4 ACCESSORIES

A. Emergency latch release: For all ceiling panels and wall panels accessible from the back which are greater than 18 by 18 inches in size, provide an interior latch release mechanism to permit panel to be opened from back (interior side) of panel.

B. Provide gasketing, as provided by the manufacturer, at doors within operating rooms, and other similar clinical areas.

2.5 FACTORY FINISHING

A. Panel assemblies fabricated from stainless steel: Nº 4 satin finish.

B. Panel assemblies fabricated from galvanized bonderized steel: Baked on rust inhibitive gray primer finish.

C. Panel assemblies fabricated from cold rolled steel: Phosphate dipped with baked on rust inhibitive gray primer finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Verify that prepared openings are ready to receive the work of this Section and opening dimensions are as indicated on the shop drawings. Verify that all blocking is set in place and secure.

B. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Beginning of installation means acceptance of project conditions.

3.2 PREPARATION

A. Maintain temperature and humidity range for the time prior to, during and after installation recommended by the product manufacturer.

3.3 INSTALLATION

A. Install access panels in accordance with manufacturer’s instructions and direction from authorities having jurisdiction. Install miscellaneous specialties absolutely level and in true line, with units securely anchored to the surrounding construction.

B. Test each door and latching device, and make adjustments required to ensure a bind-free operation and proper latching.

3.4 CLEANING

A. Upon completion of installation, clean components and accessories per manufacturer's recommended cleaning methods.

3.5 PROTECTION

A. Protect installed units after installation from damage from construction operations.

B. If damage occurs, remove and replace damaged components or entire unit as required to provide unit in its original, undamaged condition

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SECTION 085800

SLIDING GLASS WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes”

1. Interior sliding glass windows.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 061000 - ROUGH CARPENTRY: Wood blocking.

C. Section 088000 - GLAZING: Glass and glazing accessories.

1.3 REFERENCES

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 1997.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.

C. ASTM B221/B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2002.

1.4 SUBMITTALS

A. See Section 013000 - ADMINISTRATIVE REQUIREMENTS, for submittal procedures.

B. Product Data: Provide manufacturer's product data and descriptions, installation instructions, detail sheets, and specifications.

C. Shop Drawings: Indicate details, elevations and installation requirements of finish hardware.

D. Certificates: Certify that products of this section meet or exceed specified requirements.

E. Maintenance Data: Provide maintenance and cleaning instructions.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Handle products according to guidelines stated in AAMA CW-10.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. C.R. Laurence Co., Inc.; CRL Sliding Service Window: www.crlaurence.com.

B. Substitutions: See Section 016000 - Product Requirements.

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2.2 COMPONENTS

1. Sliding Windows: Factory fabricated, complete system with factory finished aluminum members and attachment devices.
2. Aluminum, dual track upper channel.
3. Vinyl guides for glass bottom.
4. Sliding Hardware:: Top-hung ball bearing rollers.
5. Basis of Design: Masteroll Track Assembly System manufactured by C.R. Laurence Co., Inc.Manual open.

2.3 MATERIALS

A. Extruded Aluminum: ASTM B221/B221M, 6063 alloy, T5 temper.

1. Finish: Class I natural anodized.

B. Fasteners: Stainless steel.

C. Perimeter Sealant: Type specified in Section 079200 - JOINT SEALANTS.

D. Glazing: Type as scheduled and as specified in Section 088000 - GLAZING..

E. Glazing Accessories: As specified in Section 088000 - GLAZING.

2.4 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.5 ACCESSORIES

A. Locks: Keyed disc tumbler rachet lock to fit glazing width with ovelap adjustable from 1" to 3 3/8", nickel finish.

1. Basis of Design: Model 965 Ratchet Lock manufactured by Knape & Vogt; www.knapeandvogt.com
2. Substitutions: See Section 016000 - Product Requirements.

B. Handles: Ergonomic extension handle.

1. Length: 6 inches (150 mm).
2. Color: As selected from manufacturer's standard palette.
3. Adhesive: As recommended by manufacturer.
4. Basis of Design: ErgoGlide manufactured by Ergo Pros; www.ergopros.com.
5. Substitutions: See Section 016000 - Product Requirements.

2.6 FABRICATION

A. Accurately fit and secure joints and corners. Make joints flush, hairline.

B. Prepare components to receive anchor devices. Fabricate anchors.

C. Arrange fasteners and attachments to conceal from view.

D. Reinforce interior horizontal head rail to receive sliding window track brackets and attachments.

E. Reinforce framing members for imposed loads.

F. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.

1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 - EXECUTION

3.1 EXAMINATION

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A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Coordinate frame anchor placement with wall construction.

C. Coordinate installation of hardware.

D. Coordinate installation of glazing.

3.3 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/16 inch (1.6 mm).

B. Maximum Offset from True Alignment: 1/16 inch (1.6 mm).

3.4 ADJUSTING

A. Adjust for smooth and balanced window movement.

3.5 CLEANING

A. Clean frame and glazing surfaces after installation, per manufacturer's instructions.

B. Remove excess glazing sealant compounds, dirt or other substances.

C. Protect installed components from subsequent construction operations.

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SECTION 087100

DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hardware for doors.

B. Seals and door gaskets.

1.2 RELATED REQUIREMENTS

A. Section 081113 - Hollow Metal Doors and Frames.

1.3 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

B. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; Builders Hardware Manufacturers Association; 2011 (ANSI/BHMA A156.2).

C. BHMA A156.6 - American National Standard for Architectural Door Trim; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.6).

D. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; Builders Hardware Manufacturers Association, Inc.; 2010 (ANSI/BHMA A156.8).

E. BHMA A156.18 - American National Standard for Materials and Finishes; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.18).

F. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012 (ANSI/BHMA A156.22).

G. BHMA A156.31 - Electric Strikes and Frame Mounted Actuators; 2007 (ANSI/BHMA A156.31).

H. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.

I. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute; 1993; also in WDHS-1/WDHS-5 Series, 1996.

J. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2012.

K. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.

B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

C. Convey Owner's keying requirements to manufacturers.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.

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C. Samples: Prior to preparation of hardware schedule:

1. Submit 1 sample of each type of hardware item illustrating style, color, and finish.
2. Samples will be returned to supplier.

D. Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, Include the following information:

1. Door Index; include door number, heading number, and Architects hardware set number.
2. Opening Lock Function Spreadsheet; list locking device and function for each opening.
3. Type, style, function, size, and finish of each hardware item.
4. Name and manufacturer of each item.
5. Fastenings and other pertinent information.
6. Location of each hardware set cross-referenced to indications on Drawings.
7. Explanation of all abbreviations, symbols, and codes contained in schedule.
8. Mounting locations for hardware.
9. Door and frame sizes and materials.
10. Name and phone number for the local manufacturer's representative for each product.
11. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and/or access control components). Operational description should include how the door will operate on egress, ingress, and/or fire/smoke alarm connection.

E. Key Schedule: After a keying meeting between representatives of the Owner, hardware supplier, and, if requested, the representative for the lock manufacturer, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled. Utilize ANSI A156.28 "Recommended Practices for Keying Systems" as a guideline for nomenclature, definitions, and approach for selecting the optimal keying system.

F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

G. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.

H. Riser and Wiring Diagrams: After final approval of the hardware schedule, submit riser and wiring diagrams as required for the proper installation of complete electrical, electromechanical, and electromagnetic products.

I. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

J. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1. Submit manufacturer's parts lists and templates.

K. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

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L. Warranty: Submit manufacturer's warranty and ensure that forms have been completed ... Owner's name and registered with manufacturer.

M. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.
2. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with five years of experience.

C. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.8 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide ten year warranty for door closers.

C. Provide three year warranty for locksets and latchsets.

PART 2 - PRODUCTS

2.1 DOOR HARDWARE – GENERAL

A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide all items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:

1. Applicable provisions of federal, state, and local codes.
2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
3. Applicable provisions of NFPA 101, Life Safety Code.
4. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

D. Finishes: All door hardware the same finish unless otherwise indicated.

1. Finish: Brushed Nickel- confirm with Owner.
2. Finish Definitions: BHMA A156.18.
3. Exceptions:

a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.

b. Door Closer Covers and Arms: Color to be selected by Architect from manufacturer's standard colors.

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E. Fasteners:

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely.
4. Hardware shall be installed with the fasteners provided by the hardware manufacturer.

2.2 HINGES

A. Hinges: Provide hinges on every swinging door.

1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
2. Provide ball-bearing hinges at all doors.
3. Provide non-removable pins on outswinging doors.
4. Where electrified hardware is mounted in door leaf, provide power transfer hinges.

B. Butt Hinges: Comply with BHMA A156.1 and A156.7.

1. 1-3/4 Inch Thick Doors, Up To and Including 36 Inches Wide: Standard weight, steel, 4-1/2 inches high.
2. 1-3/4 Inch Thick Doors Over 36 Inches Wide: Heavy weight, steel, 5 inches high.
3. Hinge Width: 4-1/2 inches at 1-3/4 inch thick doors. Adjust hinge width as required for door, frame, and/or wall conditions to allow proper degree of opening.

C. Quantity of Hinges Per Door:

1. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.
2. Gates: Two hinges.

D. Manufacturers - Hinges:

1. Assa Abloy McKinney: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. Stanley Black & Decker: www.stanleyblackanddecker.com.
4. Substitutions: See Section 016000 - Product Requirements.

2.3 PUSH/PULLS

A. Push/Pulls: Comply with BHMA A156.6.

1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
2. On solid doors, provide matching push plate and pull plate on opposite faces.

B. Manufacturers - Push/Pulls:

1. Assa Abloy McKinney: www.assaabloydss.com.
2. C. R. Laurence Co., Inc: www.crlaurence.com.
3. Hager Companies: www.hagerco.com.

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4. Hiawatha, Inc: www.hiawathainc.com.
5. Substitutions: See Section 016000 - Product Requirements.

2.4 EMERGENCY RELEASE PIVOTS

A. Provide emergency release pivot sets offset-hung to allow door to swing open in opposite direction unless detailed otherwise.

B. Manufacturers:
1. Assa Abloy Rixson: www.assaabloydss.com.
2. Ives: www.ives.ingersollrand.com.
3. Stanley Black & Decker: www.stanleyblackanddecker.com.
4. Substitutions: See Section 016000 - Product Requirements.

2.5 DOUBLE LIPPED STRIKES

A. Provide double lip strike offset-hung to allow door to swing open in opposite direction unless detailed otherwise. Size for specific frame depth. Coordinate special latchbolt-hole location and/or special template, as required, to operate with the mortise lock being used as specified.

B. Provide a compatible emergency stop/release as recommended by the manufacturer of the double lip strike or engineered to operate with the double lip strike.

C. Manufacturers:
1. Assa Abloy McKinney: www.assaabloydss.com.
2. Don-Jo Manufacturing, Inc: www.don-jo.com.
3. Hager Companies: www.hagerco.com.
4. Substitutions: See Section 016000 - Product Requirements.

2.6 EMERGENCY STOP/RELEASE

A. Provide emergency stop/release for doors with double lip strikes offset-hung to allow door to swing open in opposite direction unless detailed otherwise.

B. Manufacturers:
1. Assa Abloy McKinney: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. Stanley Black & Decker: www.stanleyblackanddecker.com.
4. Substitutions: See Section 016000 - Product Requirements.

2.7 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
1. Hardware Sets indicate locking functions required for each door.
2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
4. Provide locks with a standard 2-3/4 inch backset with a full 3/4 inch throw stainless steel mechanical anti-friction latchbolt. Deadbolt shall be a full 1 inch throw, constructed of stainless steel.
5. Provide standard ASA strikes unless noted otherwise or if extended lip strikes are necessary to protect trim.

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B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.

1. Provide cams and/or tailpieces as required for locking devices required.
2. Match Owner's existing key system.

C. Keying: Grand master keyed.

1. Include construction keying.
2. Key to existing keying system.
3. Provide patented removable core cylinders at all keyed devices and trim. Patent shall protect against the unauthorized manufacturing and duplication of the products. Patented cores shall not be operable by non-patented key blanks. Patented cores shall incorporate a mechanism to check for the patented features on the keys. Provide construction cores with construction master keying for use during construction. The hardware supplier, accompanied by the Owner or Owner's security agent, shall install permanent keyed cores upon completion of the project. The temporary construction cores are to be returned to the hardware supplier.
4. Provide permanent cores and cylinders keyed by the manufacturer or authorized distributor as directed by the Owner. Provide owner with a copy of the bitting list, return receipt requested.
5. The hardware supplier, accompanied by a qualified factory representative for the manufacturer of the cores and cylinders, shall meet with Owner to review keying requirements and lock functions prior to ordering finish hardware. Submit a keying schedule to Owner for approval.
6. Provide cores and cylinders, unless noted otherwise, operated by a Grand Master Key System to be keyed to the existing keying system (Do not use the letter "I", "O", or "X" for any of the grand masters). Allow for twenty-four Master Keys under each Grand Master, and sixty-four changes under each master key. All cylinders shall be keyed in alike or different sets as noted by their respective key set number. Do not use the letter "I" or "O" in any of the master key sets.
7. Supply keys in the following quantities:
   a. Ten master keys.
   b. Ten grand master keys.
   c. Five construction keys.
   d. Three change keys for each lock.
8. When providing keying information, comply with DHI Handbook "Keying systems and nomenclature".

D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.8 CYLINDRICAL LOCKSETS

A. Locking Functions: As defined in BHMA A156.2, and as follows:

1. Passage: No locking, always free entry and exit.
2. Privacy: F76, emergency tool unlocks.
3. Office: F82 Grade 1, push-button locks outside lever until it is unlocked with a key or by rotating the inside lever, inside lever always free for immediate egress.
4. Storeroom: F86, entrance by key only, inside lever always free for immediate egress.

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B. Manufacturers - Cylindrical Locksets:

1. Assa Abloy Sargent: 6500 Series; www.assaabloydss.com.
2. Substitutions: Not permitted.

2.9 EXIT DEVICES

A. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1, and UL listed for Panic Exit and/or Fire Exit Hardware. Cylinders: Refer to 2.4 KEYING.

B. Exit devices shall be touchpad type, fabricated of brass, bronze, stainless steel, or aluminum, plated to the standard architectural finishes to match the balance of the door hardware.

C. Touchpad shall extend a minimum of one half of the door width. Touch-pad finish shall be compatible to exit device finish. Compression springs will be used in devices, latches, and outside trims or controls, tension springs also acceptable.

D. Devices to incorporate a deadlatching feature for security and/or for future addition of alarm kits and/or other electrical requirements.

E. Provide manufacturer's standard strikes.

F. Provide exit devices cut to door width and height. Locate exit devices at a height recommended by the exit device manufacturer, allowable by governing building codes, and approved by the Architect.

G. Mechanism case shall sit flush on the face of all flush doors, or spacers shall be furnished to fill gaps behind devices. Where glass trim or molding projects off the face of the door, provide glass bead kits.

H. Non-fire-rated exit devices shall have hex key dogging.

I. Removable mullions shall be a 2 inches x 3 inches steel tube. Where scheduled, mullion shall be of a type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.

J. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to a 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.

K. Lever style will match the lever style of the locksets.

L. Lever trim on doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning.

M. Exit devices for fire rated openings shall be UL labeled fire exit hardware.

N. Field drill weep holes per manufacturer’s recommendation for exit devices used in full exterior application, highly corrosive areas, and where noted in the hardware sets.

O. Provide electrical options as scheduled.

P. Acceptable manufacturers and/or products: Falcon 24/25 series with deadlatching, Precision Apex series, Sargent 80 series with deadlatching

2.10 CLOSERS

A. Provide surface-mounted, door-mounted closers unless otherwise indicated.

B. Provide door closers certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Surface mounted mechanical closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent

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testing laboratory. Closers shall be ISO 9000 certified. Units shall be stamped with date of manufacture code.

C. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder, and shall utilize full complement bearings at shaft. Cylinder body shall be 1-1/2 inch diameter, and double heat-treated pinion journal shall be 11/16 inch diameter.

D. Provide hydraulic fluid requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F. Fluid shall be fireproof and shall pass the requirements of the UL10C “positive pressure” fire test.

E. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force as required by accessibility codes and standards. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.

F. Provide closers with a solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within a 6-inch top rail without the use of a mounting plate so that closer shall not be visible through vision panel from pull side.

G. Closers shall not incorporate Pressure Relief Valve (PRV) technology.

H. Closer cylinders, arms, adapter plates, and metal covers shall have a powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or shall have special rust inhibitor (SRI).

I. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.

J. Mount closers on room side of corridor doors.

K. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.

L. Manufacturers - Closers:

1. Assa Abloy Sargent: 281 Series; www.assaabloydss.com.
2. Substitutions: Not permitted.

2.11 ACCESS CONTROL SYSTEM

A. Provide all components necessary for a complete installation including operating system, cabling and proximity card readers.

B. Match Owner's existing access control system. Tie into and extend existing system as required.

2.12 STOPS AND HOLDERS

A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.

1. Provide wall stops, unless otherwise indicated.
2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

B. Wall Stops: Provide concave type for cylindrical type locks.

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C. Overhead Holders/Stops: Friction type at doors without a closer and positive type at doors with a closer.

1. Provide medium duty surface mounted overhead stop for any door that swings more than 140 degrees before striking a wall, open against equipment, casework, sidelights, and/or where conditions do not allow a wall stop.

D. Manufacturers - Overhead Holders/Stops:

1. Assa Abloy Rixson or Sargent: www.assaabloydss.com.
2. DORMA Group North America: www.dorma-usa.com/usa.
3. Glynn-Johnson: www.glynn-johnson.com.
4. Substitutions: See Section 016000 - Product Requirements.

E. Manufacturers - Wall Stops:

1. Assa Abloy McKinney: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. Hiawatha, Inc: www.hiawathainc.com.

2.13 GASKETING AND THRESHOLDS

A. Gaskets: Complying with BHMA A156.22.

1. Provide door gasketing and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
   a. Basis of Design - Gaskets: Sponge Silicone by Pemko.
   b. Basis of Design - Automatic Door Bottom: mortised-type as manufactured by Pemko #411.
2. On doors indicated with "sound gasketing", provide sound-rated gaskets and automatic door bottom; make gaskets completely continuous, do not cut or notch gaskets for installation.
3. For double acting privacy doors provide frame mounted self-adhesive polypropolyene pile brush gasketing, size as required to seal gap between door and frame for visual privacy.

B. Manufacturers - Gasketing and Automatic Door Bottoms:

1. Assa Abloy McKinney: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. National Guard Products, Inc: www.ngpinc.com.
4. Pemko Manufacturing Co: www.pemko.com.
5. Substitutions: See Section 016000 - Product Requirements.

2.14 KICK PLATES, ARMOR PLATES, MOP PLATES:

1. 0.050 inch thickness, beveled 4 edges, screws shall be oval head counter-sunk.
2. All plates shall be 2 inches less the width of door.
3. Kick Plates: 8 inches high.
4. Armor Plates: 48 inches high.
5. Mop Plates: 4 inches high.

2.15 KEY CONTROLS

A. Deliver grand master keys, master keys, change keys, and/or key blanks from the factory or authorized distributor directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may be cause to require replacement

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of all or any part of the keying system that was compromised at no additional cost to the Owner.

B. Key Management System: For each keyed lock on project, provide one set of consecutively numbered duplicate key tags with hanging hole and snap catch.

1. Security Key Tags: For each keyed lock on project, provide one set of matching key tags for permanent attachment to one key of each set.

2. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to number of keys to be managed.

C. Visual Key Control:

1. Keys shall be stamped with their respective key set number and stamped “DO NOT DUPLICATE".

2. Grand master and master keys shall be stamped with their respective key set letters.

3. Do not stamp any keys with the factory key change number.

4. Do not stamp any cores with key set on face (front) of Core. Stamp on back or side of cores so not to be visible when core is in cylinder.

2.16 BYPASSING DOOR HARDWARE

A. Bypassing Door Hardware: Track, hanger fasteners, guides, and pulls; size track and hangers according to manufacturer's recommendations for weight of doors.

1. Provide flush cup pull on each sliding panel.

B. Manufacturers - Bypassing Door Hardware:

1. Hager Companies: www.hagerco.com.

2. Johnson Hardware: www.johnsonhardware.com.

3. Stanley Black & Decker: www.stanleyblackanddecker.com.

4. Substitutions: See Section 016000 - Product Requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.2 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Do not install surface mounted items until finishes applied to substrate are complete.

D. Mounting heights for hardware from finished floor to center line of hardware item:

1. For steel frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."

2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

3.3 FIELD QUALITY CONTROL

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A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.4 ADJUSTING

A. Adjust work under provisions of Section 017000.

B. Adjust hardware for smooth operation.

3.5 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.6 PROTECTION

A. Protect finished Work under provisions of Section 017000.

B. Do not permit adjacent work to damage hardware or finish.

3.7 SCHEDULE

A. **Group 1**
1. Hinges
2. Passage set
3. Wall stop
4. Sound gasketing

B. **Group 2**
1. Hinges
2. Privacy lockset
3. Pile brush gasketing
4. Wall stop
5. Closer
6. Robe hook, per Section 102813

C. **Group 3**
1. Hinges
2. Storeroom lockset
3. Wall stop

D. **Group 3A**
1. Hinges
2. Classroom lockset
3. Wall stop

E. **Group 4**
1. NOTE USED

F. **Group 5**
1. NOT USED

G. **Group 6**
1. Electric hinges
2. Exit devise
3. Electric strike
4. Lever handle on exterior side
5. Closer
6. Card Reader by Security Vendor

H. **Group 7**

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1. Electric hinges
2. Electric strike
3. Lever handle on both sides
4. Closer
5. Card Reader by Security Vendor

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SECTION 088000

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install the following:

1. Tempered glass in non-rated hollow metal doors and frames.
2. Wire-less fire resistant rated glazing in designated rated doors and frames.
3. All materials required to properly install glass furnished hereunder, including sealant, tapes, setting blocks, and spacers.

B. Work of this section includes installation of glazing beads furnished under related sections.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

1.3 QUALITY ASSURANCE

A. General: Perform glazing work in accordance with GANA - Glazing Manual, FGMA Glazing Manual, SIGMA and LSGA standards for glazing and installations methods.

1. Notify the COR and the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Qualifications:

1. Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.
2. Welders Certificates: Utilize only qualified welders employed on the Work. Submit verification that Welder’s are AWS D1.1 and D1.4 qualified within the previous 12 months.

1.4 WARRANTY

A. Manufacturer Warranty/Guarantee: All shall include replacement of defective glass and delivery of replacement glass products furnished f.o.b. from point of manufacturer to project site.

1. Insulating Glass: Manufacturer's 10 year written guarantee covering insulating glass against defects in materials and workmanship, including failure of seals effective on date of original factory shipment to site.

a. Provide coverage in Guarantee for manufacturing defects, including failure of thermetic seal of air space (except by glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coating or other visual indications of seal failure or performance.

PART 2 - PRODUCTS

2.1 GLASS - GENERAL

A. General requirements for glass: Of domestic and foreign manufacture, conforming to the referenced standards and with the additional requirements specified herein; factory labeled on each pane stating the strength, type, thickness and quality; with all labels remaining on glass until final cleaning.

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1. Glass thickness shown and heat treatment specified are minimum requirements. Provide glass thickness and heat treatment as required to meet specified performance criteria, State and local codes and ordinances.

B. Heat Strengthened Glass: Comply with ASTM C 1048 HS, heat strengthened, Class 1 clear, quality q3 glazing select.

C. Tempered Glass: Comply with ASTM C 1048 FT, fully tempered, Class 1 clear, quality q3 glazing select, conforming to ANSI Z97.1.

2.2 GLASS TYPES

A. Glass Type GL-1: Fully tempered clear safety glass: 1/4 inch thick.

B. Glass Type GL-2: 8mm-9 mm thick (5/16 inch-3/8 inch) transparent wire-less fire rated ceramic glazing material with polished finish.

1. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

a. Nippon Electric Glass Co., Ltd., “Firelite Plus”.

b. Vetrotech Saint-Gobain, “SSG Keralite FR-L”.

c. SAFTI First, “Pyran Platinum L”.

2. For fire rated door assemblies, conform with latest edition of ASTM E152, ASTM E163, NFPA-80, NFPA 252, NFPA 257.

3. Conforms to ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

4. Permanently identify each individual glazing unit with a listing mark visible after installation.

5. In accordance with manufacturer's specifications, Firelite Plus must be glazed into frames with a similar rating, using silicone glazing compound which shall be supplied with the Firelite Plus material.

2.3 FABRICATION

A. General: Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Project Engineer/VA-COR and the Architect.

B. Fabricate glass as required to openings with edge clearances and bite on glass as recommended by the manufacturer with clean-cut edges where concealed, and smoothground,polished and seamed edges where exposed to view. Do not cut, seam, nip or abrade glass after heat-tempering.

1. For non-tempered to be cut at site, provide glass larger than required so as to obtain clean cut edges without seaming or nipping.

C. Fabricate glass with the following edge treatments.

1. Exposed edges: Polished-finished radiused (penciled).

2. Concealed edges: Cut edges with minimum edge work.

2.4 ACCESSORIES

A. Glazing tape: Preformed butyl-polyisobutylene rubber with 100 percent solids contained in extruded tape roll form and complying with AAMA 804.1; coiled on release paper; of sizes required for proper glazing. equal to one of the following:

1. Protective treatments 3030 or 606.

2. Tremco Preshimmed 440.

3. Woodmont Chem-Tape 40.

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B. Setting blocks: Neoprene, 80-90 shore A durometer hardness, certified to be “silicone compatible”; sized as follows:

1. Length: 0.1 inch per square foot of glass, but not less than 4 inches.
2. Width: equal to glazing rabbet space minus 1/16 inch.
3. Height to suit glazing method and pane weight and area.

C. Spacers: Neoprene, 60-80 shore A durometer hardness; sized as required.

D. Glazing sealant:

1. General glazing sealant: One-part medium modulus, neutral curing, synthetic rubber sealant, having a useful life expectancy of at least 20 years, conforming to ASTM C 920, Type S, grade NS, Class 25 for uses NT, G and A, FS TT-S-001543A, Type, Class A. Color as selected by the COR and the Architect.
   a. Dow Corning Corporation, Midland, MI.; product, “Silicone Glazing Sealant”.
   b. General Electric Company (GE Silicones) Waterford, NY.; product, “SilGlaze II SCS2800”.

E. Bond-breakers and backing materials: Type recommended by manufacturer of sealants and gaskets.

F. Cleaners, Primers, and Sealers: Type recommended by manufacturer of glass and gaskets.

2.5 ACCESSORIES FOR WIRE-LESS FIRE-RATED GLAZING

A. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent.

B. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Available Products:

1. Dow Corning Corporation, Midland, MI.; product, “795”.
2. General Electric Company (GE Silicones) Waterford, NY.; product “Silglaze-II 2800”
3. Tremco, Beachwood, OH.; product, “Spectrem 2”.

C. Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

PART 3 - EXECUTION

3.1 INSTALLATION - DRY GLAZING

A. Utilize dry glazing methods for field installation of glass in interior doors and frames.

1. Install in vision panels in fire-rated doors and frames to requirements of NFPA 80.
2. Install so that appropriate UL, Warnock Hersey, or other approval labeled markings remain permanently visible.

B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (2 mm) above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane.

E. Place glazing tape on free perimeter of glazing in manner as described above.

F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

G. Knife trim protruding tape.

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3.2 INSTALLATION - WET GLAZING

A. Utilize wet glazing methods for field installation of glass in exterior curtainwall, storefront and window systems.

B. Place setting blocks at quarter points on web of sill receiving member. Set glass unit in place with equal spaces on all sides.

C. Install spacers at a spacing not exceeding 24 inches apart uniformly around perimeter, between interior face of glass unit and the fixed glazing rabbet.

D. Apply a continuous heel bead of specified sealant between the outer edges if the glass unit and the web of the receiving member, in sufficient quantity to engage the leg of the applied glazing stop, when installed.

E. As the glazing stop is being applied, install spacers between the outer face of the glass unit and the stop, locating the spacers directly opposite the previously installed interior spacers. Install the glazing stops, ensuring that all clearances around the perimeter of the glass unit conform to the requirements of the respective standards referenced herein.

F. Apply a continuous bead of sealant around the exterior and interior perimeters, between the glass unit and the fixed rabbet, and between the glass unit and the applied glazing stop, extending the sealant material slightly above the sight line to permit proper tooling thereof.

G. Tool all exposed sealant at a 45 degree angle away from the glass surface, leaving the sealant surface uniformly dense and smooth.

H. Immediately remove all excess sealant from surfaces of metal and glass.

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SECTION 090506

COMMON WORK RESULTS FOR FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes general requirements for flooring preparation, installation and temporary protection.

1. Provide independent testing laboratory services to perform relative humidity, moisture vapor emission, and pH tests on in situ concrete slabs, which shall be in addition to testing as may be performed by Owner.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 030513 - CONCRETE SEALERS: Concrete sealers/coatings on exposed-to-view concrete floors.

E. Section 096513 - RESILIENT BASE AND ACCESSORIES: Resilient base.

F. Section 096516 - RESILIENT SHEET FLOORING: Sheet vinyl flooring.

G. Section 096519 - RESILIENT TILE FLOORING: Resilient tile and plank flooring.

1.3 REFERENCES

A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.

1. ASTM F-710 - Preparing Concrete Floors to Receive Resilient Flooring.

2. ASTM F-1869 – Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

3. ASTM F-3010 – Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings.

4. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. General: Coordinate flooring work with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

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B. Pre-Installation Meetings: At least 30 calendar days prior to commencing any flooring work, conduct a pre-installation conference at the Project site. Coordinate time of meeting to occur prior to installation of work under the related sections named below.

1. Required attendees:
   a. Owner.
   b. Architect.
   c. Construction Manager.
   d. Project Superintendents representing each floor system installer.
   e. Manufacturer's technical representative(s) for flooring products as designated by Architect or Contractor.
   f. Representatives of related trades as directed by the Architect or Contractor, and representatives for installers of related work specified under the following Sections:
      1) Section 030513 - CONCRETE SEALERS.
      2) Section 096516 - RESILIENT SHEET FLOORING.
      3) Section 096519 - RESILIENT TILE FLOORING.

2. Agenda:
   a. Scheduling of preparation and flooring operations.
   b. Procedures for testing of relative humidity and moisture content of in situ substrates.
   c. Water vapor emission control methods.
   d. Review of staging and material storage locations.
   e. Coordination of work by other trades.
   f. Protection of completed Work.
   g. Establish humidity and temperature limitations for performing the work, to which Architect and Contractor must agree.
   h. Discuss process for inspection and acceptance of completed Work of this Section.

C. Sequencing:

1. Sequence flooring installation when base cabinets or other built-in casework is present on the substrate.

2. Field Measurements:
   a. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.
   b. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.

3. Ensure that installation of flooring and accessories occurs after other finishing operations, including painting.

1.5 RELATIVE HUMIDITY, MOISTURE VAPOR EMISSION AND ACIDITY/ALKALINITY (PH)TESTING

A. Concrete slabs and floors:

1. Construction Manager shall employ and pay for services of an independent testing laboratory to perform relative humidity, moisture vapor emission, and pH tests on concrete slabs as follows. The test shall be witnessed by the Contractor, flooring subcontractors and Owner's Project Representative.
   a. Relative Humidity, Moisture Vapor Emission and pH Testing on all concrete slabs over-which a finished floor is to be installed. This includes, but is not limited to:
      1) Resilient sheet flooring, including (but not limited to) linoleum, and vinyl flooring.

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2) Resilient tile and plank flooring, including (but not limited to) linoleum, soli vinyl and composite flooring.
3) Painted floors and concrete sealers.
4) Carpeting.

b. Perform moisture and pH tests on all concrete floors over-which stone flooring is to be applied.

2. Requirements: As specified under Part 3 of this Section.
   a. Submit 1 copy of test data to the installers of all flooring materials or coating materials scheduled to be installed.
   b. Provide additional testing in the event test results indicate higher moisture content than recommended by the flooring material and coating material manufacturers for the installation of their products. Perform such additional testing, at no additional cost to the Owner, after procedures have been performed to reduce moisture content to ratings acceptable to the various flooring and coating manufacturers.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that spaces to receive flooring finishes are suitable for installation. Do not proceed with work until unsatisfactory conditions are corrected. Comply with manufacturer's recommendations including the following:

1. Substrates shall be dry and clean.
2. Substrates shall be free of depressions, raised areas, or other defects which would telegraph through installed flooring.
3. Verify concrete substrates have a flat tolerance of 3/16" in ten linear feet.
4. Temperature of resilient flooring and substrate shall be within specified tolerances.
5. Moisture condition and adhesive bond tests shall be performed as specified herein.

B. For applications on concrete, verify curing, hardening, or breaking compounds have not been used. If there are any, do not proceed until compounds have been removed as specified.

C. For applications on concrete slab on grade or below grade, verify vapor barrier below slab was installed. If no vapor barrier was installed, do not proceed with work unless written acceptance of such conditions is received and submitted.

D. Perform testing of in situ concrete, relative humidity and surface pH testing to all concrete slabs specified to be covered with floor coverings or resinous coatings as specified herein. Do not proceed with work until results of moisture condition tests are acceptable.

3.2 PREPARATION

A. General: Comply with flooring manufacturer's requirements for preparation of substrate to receive resilient flooring.

B. Vacuum clean substrate, and ensure that substrate is dry, clean and smooth prior to application of flooring.

C. Remove, by light sanding and grinding, all protruding edges, high spots.

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D. Ensure substrate is flat to a plus or minus 1/8 inch in 10 feet tolerance. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

E. Ensure that substrate is free from paint, varnish, wax, oil, existing adhesive residue, or other foreign matter.

F. Apply primers as recommended by adhesive manufacturer's written instructions.

G. Condition flooring materials, accessories and adhesives to room temperatures for a period of 48 hours minimum.

3.3 TESTING IN SITU CONCRETE SUBSTRATES

A. Scope:

1. Provide in situ concrete relative humidity and surface pH testing to all concrete slabs specified to be covered with floor coverings or resinous coatings. Includes concrete placed as part of this Work which occurs below grade, above grade (suspended slabs), and slabs on grade.
   a. Existing building suspended slabs may be excluded from this requirement.

B. Scheduling:

1. Testing shall take place after allowing concrete to dry for a minimum of 90 days. Testing to be scheduled no less than one, nor more than three weeks prior to scheduled flooring installation.
   a. DO NOT conduct testing unless the slab environment is identical to that In which the finished flooring Is to be installed.

2. In the event new flooring is to be installed over existing resilient flooring, remove the portion of the existing flooring and adhesive directly under the area where testing will be conducted. Patch flooring to match existing construction after completion of testing.

C. Test result submittals:

1. Report all test results in chart form listing test dates, time, depth of test well, in situ temperature, relative humidity, moisture vapor and pH levels.

2. List test locations on chart and show same on marked up Floor Plan Drawings.

3. Submit results In duplicate. Deliver copies directly to Architect, Owner's Project Representative and Construction Manager.

4. Submit results In duplicate. Deliver copies directly to Architect, Owner's Project Representative and Construction Manager.

D. Testing equipment: shall be equal to the following

1. For relative humidity testing:
   a. Digital Meter and Calibrated Humidity and Temperature probe kit as manufactured by Vaisala Inc. (Boston Office) 10D Gill Street, Woburn, MA, 01801 (telephone 781-933-4500).
      1) Minimum 2 point probe calibration.

2. For calcium chloride testing:
   a. Anhydrous calcium chloride testing in accordance with Rubber Manufacturer's Association (RMA) Test requirements.
   b. Test kits: Vaprecision, inc. 2941 West MacArthur Boulevard, Suite 135. Santa Ana, CA 92704 (telephone 800-449-6194).

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3. For pH testing:
   a. pH test paper by Micro Essential Laboratory, Inc., P.O. Box 100824 4224 Avenue "H", Brooklyn, NY 11210, (telephone 718-338-3618).
   b. Distilled or de ionized water.

E. Testing Procedures Quantification of Relative Humidity

1. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. If meeting this criteria is not possible, then minimum conditions should be 75 degrees F (plus or minus 10 degrees F), and 50 percent (plus or minus 10 percent) relative humidity. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be Included with the test report.
2. The number of In situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 square feet and 1 per each additional 1,000 square feet.
3. Drill test holes utilizing a roto hammer drill. Hole diameter shall not exceed outside diameter of the insertabie test sleeve by more than 0.04 inch. Drilling operation must be dry. Determine the thickness of the concrete slab from Construction Documents. Depths of test holes shall be as follows:
   a. For elevated slabs (not poured in pans): Drill test holes to a depth equal to 20 percent of the concrete thickness.
   b. For slabs on grade and elevated slabs in pans: Drill test holes to a depth equal to 40 percent of the concrete thickness.
4. Vacuum all concrete dust from test hole.
5. Insert a hole liner, or sleeve, to the full depth of test hole, assuring that the liner is capped or plugged at the end protruding from the concrete surface.
6. Permit the test site to acclimate, or equilibrate, for 72 hours prior to taking relative humidity readings.
7. Remove the sleeve plug and place a probe into the sleeve assuring that it reaches the bottom of the test hole.
8. Allow the probe to sit in the test sleeve for 30 minutes before taking readings.
9. Read and record temperature and relative humidity at the test site.

F. Testing Procedures - Quantification of Concrete Moisture Vapor Emission through Calcium Chloride Testing.

1. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. If meeting this criteria is not possible, then minimum conditions should be 75 degrees F (plus or minus 10 degrees F) and 50 percent relative humidity (plus or minus 10 percent). When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.
2. The number of vapor emission test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 In the first 1.000 square feet and I per each additional 1,000 square feet.

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3. Tests sites are to be cleaned of all adhesive residue, curing compounds, paints, sealers, floor coverings, and similar materials. 24 hours prior to the placement of test kits.
4. Weigh test dish on site prior to start of test. Scale must report weight to 0.1 grams. Record weight and start time.
5. Expose Calcium Chloride and set dish on concrete surface.
6. Install test containment dome and allow test to proceed for 60 to 72 hours.
7. Retrieve test dish by carefully cutting through containment dome. Close and reseal test dish.
8. Weigh test dish on site recording weight and stop time.
9. Calculate and report results as pounds of emission per 1,000 square feet per 24 hours."

G. Testing Procedures Quantification of Acidity/Alkalinity (pH) Level

1. At or near the relative humidity test site and each vapor emission (calcium chloride) test site, perform pH test.
   a. At each testing site, lay down a loose 2 foot by 2 foot sheet of non perforated sheet backed by plywood. Leave in place for 48 hours.
   b. Remove sheet and place several drops of distilled or de ionized water onto the concrete surface to form a puddle approximately 1 inches in diameter.
   c. Allow the water to set for approximately 60 seconds.
   d. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading.
2. Record and report results.

H. Testing Procedures:

1. Initial testing: Provide 3 tests for the first 1,000 square feet.
2. Add one test for each additional 1,000 square feet.
3. Concrete surface area to be tested shall be completely clean. Remove all adhesives, residue, debris and sealing compounds. Remove all dust by vacuum or other methods. Do not use chemicals of any kind to clean concrete.
4. Perform moisture tests in strict accordance with the kit manufacturer's Instructions. Moisture tests shall remain undisturbed for 60 to 72 hours.
5. Immediately after moisture test has been removed from test area, conduct pH test in area previously covered by plastic dome of moisture test kit.
6. After completion of tests submit 2 copies of test data to the Architect. Submit a copy of the test data to all installers of flooring materials and resinous flooring materials scheduled to be installed.
7. Provide additional testing in the event test results indicate higher moisture content than recommended by the flooring material and coating material manufacturers for the installation of their products. Perform such additional testing, at no additional cost to the Owner, after procedures have been performed to reduce moisture content to ratings acceptable to the various flooring and coating manufacturers.

3.4 FLOOR PREPARATION – GENERAL REQUIREMENTS

A. General: Comply with ASTM F 710-92 and manufacturer's recommendations for surface preparation. Remove substances incompatible with resilient flooring adhesive by method acceptable to manufacturer.

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1. Concrete floors with steel troweled (slick) finish shall be properly roughened up (sanded) to ensure suitable adhesion.
2. Concrete floors with curing, hardening, and breaking compounds shall be abraded with mechanical methods only to remove compounds. Use blastrac or similar equipment.

B. Fill voids, cracks, and depressions with trowel-applied leveling compounds acceptable to manufacturer. Remove projections and repair other defects to tolerances acceptable to manufacturer.

C. Vacuum subfloors immediately prior to installation to remove loose particles.

3.5 ADHESIVE BOND TESTING

A. Use the specified flooring and recommended adhesive, install approximately 3 by 3 foot sized flooring as specified under individual flooring specification sections. Install test samples approximately 50 feet apart throughout the area. Areas next to walls or other light traffic areas should be selected for the bond test. Tape down the perimeter of the flooring to prevent drying of the adhesive at the edges. After a minimum period of 72 hours the flooring should be pulled from the subfloor. If an unusual amount of force is required, the bond could be considered sufficient. Floors demonstrating unsuitable bond to substrate require modifications to flooring installation and may require application of moisture mitigation products. Review all conditions with Architect.

3.6 PROTECTION

A. Provide protection of completed flooring areas from construction traffic until Substantial Completion of the General Contract. Cover all floor surfaces with heavyweight kraft paper and overlay with red-rosin paper, taping the edges to maintain position of the protection paper. Reapply papers as required to maintain floor protection.

END OF SECTION

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SECTION 092216

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 092900 - GYPSUM BOARD: Gypsum board, applied over metal framing installed by this Section 092216 including: gypsum board, and related trim components.

1.3 REFERENCES

A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.
1. ASTM C 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process..
2. ASTM C 645 - Non-Load Bearing Steel Studs, Runners, and Rigid Furring Channels for Screw Application of Gypsum Board.
3. ASTM C 646 - Steel Drill Screws for the Application of Gypsum Sheet Material to Light Gage Steel Studs.
4. ASTM C 754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard.
5. ASTM E 90 - Method of Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
6. ASTM E 119 - Fire Tests of Building Construction and Materials.
7. GA 203 - Installation of Screw-Type Steel Framing Members to Receive Gypsum board.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work
2. Work of this Section shall be closely coordinated with the work of Section 092900 - GYPSUM BOARD to assure the steady progress of the Contract.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

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1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Seismic Compliance: Nonstructural components that are permanently attached to structures and their support attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance to local jurisdiction.

C. Sole Source: Obtain products required for the Work of this Section from a single manufacturer.

D. Qualifications: Installer/Applicator: Minimum of 3 years documented experience demonstrating previously successful work of the type specified herein.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:
1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.

B. Storage and Handling Requirements:
1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
2. Protect materials from damage due to moisture, surface contamination, corrosion and damage from construction operations and other causes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. 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.

B. 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.

2.2 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
1. Metal components and related items (including non-rated deflection track assemblies):
   a. Marino\Ware, Division of Ware Industries, South Plainfield NJ.
   b. Cemco Steel Framing and Metal Lath, City of Industry, CA.
   c. Telling Industries, Mentor, OH.
   d. Super Stud Building Products, Inc., Edison NJ.
2. Fire rated deflection track assemblies:
   a. Cemco Steel Framing and Metal Lath, City of Industry, CA.
   b. The Steel Network, Inc., Durham, NC.
   c. Fire Trak Inc., Watkins, MN.

B. The design and details as shown on the drawings and the model numbers specified herein are to establish the standards of design and quality and not to limit competition.

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2.3 DESCRIPTION

A. Regulatory Requirements:
1. Obtain certificate of compliance from authority having jurisdiction indicating approval of specified products.
2. Fire resistance ratings: Where gypsum board systems with fire-resistance ratings are indicated, provide materials and assemblies of the rating required, tested per ASTM E 119, which are identical to those indicated by reference to Gypsum Association file numbers in "Fire Resistance Design Manual" or to design designation in the Underwriters Laboratories "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction and to the Owners' insurance underwriters.
   a. Fire-Test-Response Characteristics: Provide components that comply with rating requirements specified for fire-rated assemblies under UL 2079 for non-load bearing wall systems.
      1) Deflection Clips and Firestop Track: Connections and/or top runner provided in fire-resistance-rated assemblies shall be certified by UL 2079 for cyclic movement requirements.

2.4 FRAMING MATERIALS

A. “Hat shaped” Furring channels: 7/8 x 2-3/4 inch, roll-formed, hat-shaped, furring channel 25 gage hot-dip galvanized steel galvanized steel conforming to ASTM C 645.

B. Resilient furring channels: Roll-formed, hat-shaped, 1/2 x 2-5/8 inch, 26 gage hot-dip galvanized steel conforming to ASTM C 645, with pre-punched holes, equal to Dietrich Industries, Inc., Pittsburgh PA, Metal Channel “RC1”.

C. Furring channels: ‘Z-shaped’ 1-1/2 inch depth, roll-formed, 25 gage (0.179 inch [0.45 mm] minimum thickness), hot-dip galvanized steel.

D. Studs: ‘C-shaped’ screw studs, hot-dip galvanized steel complying to ASTM C 645, 20 gage-equivalent (nominal 0.02 inches [0.75 mm] factory ribbed and/or embossed for performance equivalent to 20 gage (0.0329 inch [0.84 mm] minimum thickness studs), of widths indicated on the Drawings.
1. Acceptable products include the following or approved equal:
   a. Marino\Ware, Division of Ware Industries, product: “ViperStud Viper20”.
   b. Cemco Steel Framing and Metal Lath, product; “ViperStud Viper20”.
   c. Telling Industries, product; “ViperStud”.
   d. Super Stud Building Products Inc., product: “Edge EQ, EDS20P”.
2. Provide full 20 gage (0.0329 inch [0.84 mm] minimum thickness studs where required under the indicated UL assemblies to meet fire resistance ratings.

E. Runners for metal studs: ‘U-shaped’ hemmed, hot-dip galvanized steel track conforming to ASTM C645, of gage and width to match respective stud sizes, or heavier gage per design requirements, having 1-1/4 inch leg, provided at tops and bottoms of all studs and at heads of all openings in stud partitions.

F. Internal reinforcement for various stud conditions, and bracing as required: 10 gage, minimum, galvanized steel.

G. Furnish cross bracing and knee bracing, as required to assure a completely rigid assembly on metal stud partitions and furred areas.

2.5 DEFLECTION TRACK ASSEMBLIES

A. Non Fire-Rated Assemblies:
1. Deflection Track: Manufacturer’s standard top runner with extended flanges designed to prevent cracking of gypsum board applied to interior partitions resulting from deflection of the structure above fabricated from steel sheet complying with ASTM A 653 or ASTM A 568. Thickness as indicated for studs, and width to accommodate depth of studs, and the following configuration.

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a. Top runner with extended deep flanges that have one of the following: V-shaped offsets that compress, slots 1 inch on center that allow fasteners for stud attachment; 16 gage sliding clip assemblies attached to top track and clipped to stud, or double track systems as required to meet anticipated vertical movement.

2. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
   a. Marino\Ware, Division of Ware Industries, product: “Slotted Track”.
   b. Cemco Steel Framing and Metal Lath, product; “Slotted Track CST”.
   c. Telling Industries, product; “ViperTrack Deep Leg Deflection Track”.
   d. Super Stud Building Products Inc., product: “ITTC 450 Top Track Deflection Clip”.
   e. The Steel Network, Inc., product; “VertiTrack VT”, “VertiTrack VTD”, or “VertiClip SLD”.

B. Fire-Rated Assemblies: Head of wall dynamic fire rated joint systems for assemblies in compliance with UL 2079 HW-D. Provide clips or deep leg track system including step bushings complying with ASTM C 645 fabricated from steel sheet complying with ASTM A 653 or ASTM A 568. Thickness as indicated for studs, and width to accommodate depth of studs.
   1. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
      a. Cemco Steel Framing and Metal Lath, product; “FAS Track UL Assemblies”.
      b. The Steel Network, Inc., Durham, NC. product; “VertiClip SLD”.
      c. Fire Trak Inc., Watkins, MN, product “Fire Trak”, or “Posi Clips”

C. Coordination: Verify with partition schedule on the Drawings to ensure proper depth of flange offsets at various partitions types.

2.6 CEILING AND SOFFIT FRAMING MATERIALS

A. Carrying channels, 2 inches deep, 16 gage cold-rolled channels, galvanized.

B. Support channels: 3/4 inches deep, 16 gage cold-rolled channels, galvanized.

C. Furring Channels: 7/8 x 2-3/4 inch, roll-formed, hat-shaped, furring channel 25 gage hot-dip galvanized steel galvanized steel conforming to ASTM C 645.

D. Metal Studs used in soffit and ceiling framing: ‘C-shaped’ screw studs, hot-dip galvanized steel complying to ASTM C 645, 25 gage, of widths indicated on the Drawings, or other gages as required under the specified standards to meet fire resistance ratings.

2.7 ACCESSORIES

A. Metal sheet plate blocking and bracing, where indicated: galvanized sheet 0.0312 inch thickness (20 gage).

B. Fasteners:
   1. Expansion-type fasteners for securing vertical concrete and masonry surfaces.
   2. Concrete stub nails for securing runners to concrete.
   3. Nº.7 by 7/16 inch Pan head self-drilling screw to attach metal framing components.

C. Reinforcing plates for blocking: 20 gage cold rolled sheet steel, provide minimum 6 inch width, or as otherwise indicated on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.
   1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

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B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Install studs so flanges within framing system point in same direction.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate 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.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
   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. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
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. 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.
   a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. 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.

D. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 072100 Thermal Insulation, vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

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4. 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.

3.3 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

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.
      a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
   3. 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.
   4. 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.
   5. Do not attach hangers to steel roof deck.
   6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
   7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
   8. 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.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

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SECTION 092900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Interior gypsum board.
2. Trim accessories.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 078400 - FIRESTOPPING: Firestopping, firesafing, smoke seals and related accessories.

E. Section 092216 - NON-STRUCTURAL METAL FRAMING for non-structural steel framing and suspension systems that support gypsum board panels.

F. Document 099100 - PAINTING: Coating systems for interior surfaces.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

B. Scheduling:
1. Do not install sheathing until all pipes, ducts, conduits, and other such items which are to be enclosed thereby, have been permanently installed, inspected and approved.

1.4 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:
1. Product Data, (for each type of product): Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
2. Shop Drawings:
a. Details of any special conditions associated with fireproofing.
b. Mark-up a set of blackline interior elevations indicate corrections to grid layout and provide dimensioning showing locations of all proposed control joints and expansion joints.
1) Provide interior elevation drawings for interior elevations which are not included as part of the Contract Drawing set.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum five years of experience.

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1.6 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.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, 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, 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.

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.

B. 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.

C. Gypsum Board Assemblies: Provide completed assemblies complying with ASTM C840 and GA-216.
   1. Interior Partitions Indicated as Acoustic: Provide completed assemblies with the following characteristics:
      a. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
   2. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.
      a. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
      b. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
      c. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

D. Performance Requirements: Fabricate and install systems as indicated but not less than that required to comply with ASTM C754 under the following conditions:
   1. Gypsum board partitions: Standard systems: Maximum deflection of L/240 of partition height, systems to receive tile: maximum deflection of L/360 of partition height.

2.2 BOARD MATERIALS

A. Standard gypsum board: Conforming to ASTM C1396, 5/8 inch thick, except where other thickness are indicated on Drawings, of lengths to minimize end joints, with tapered edges.
   1. Acceptable products include the following, or approved equal:
      a. USG Sheetrock brand “Gypsum Panels”
      b. National Gypsum Company, Gold Bond brand product “Gypsum Board”.
      c. G-P Gypsum Corporation product, “Toughrock”.

B. Fire rated gypsum board: UL fire resistance rated, ASTM C 1396 ‘Type X’ board, 5/8 inch thick, 48 inch width, of lengths to minimize end joints, with tapered edges.

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1. Acceptable products include the following, or approved equal:
   a. USG Sheetrock brand "Firecode Core"
   b. National Gypsum Company, Gold Bond brand product "Fireshield Gypsum Board".
   c. G-P Gypsum Corporation product, "Toughrock Fireguard".

C. Sag-resistant gypsum board ceiling panels: Non-rated 1/2 inch thick, 48 inch width, of lengths to minimize end joints, with tapered edges, conforming to ASTM C1396, ASTM C1395 and ASTM C1396.
   1. Acceptable products include the following or approved equal:
      a. USG Sheetrock brand product "Interior Ceiling Panel, Sag Resistant".
      b. National Gypsum Company, Gold Bond brand product "High Strength Ceiling Board:
      c. G-P Gypsum Corporation product, "Toughrock" 1/2 CD Ceiling Board"
   2. At fire-resistant rated ceilings, provide 5/8 inch thick fire-rated gypsum board as specified herein.

2.3 ACCESSORIES

A. Gypsum board metal trim accessories:
   1. Corner beads: 1-1/4 by 1-1/4 inch corner bead for finishing with joint compound fabricated from galvanized steel conforming with ASTM C-1047.
      a. Acceptable products include the following or approved equal:
         1) Bailey Metal Products Ltd., model D100
         2) Deidrich Metal Framing, model CBS.
         3) Gold Bond product, 1-1/4 inch Wallboard Corner Bead.
         4) USG product "Dur-A-Bead - number 103"
   2. Casing beads: Edge casing bead with 1/2 inch back leg, for finishing with joint compound fabricated from galvanized steel conforming with ASTM C-1047.
      a. Acceptable products include the following or approved equal:
         1) Bailey Metal Products Ltd., model D-200
         2) Deidrich Metal Framing, model M20B.
         3) Gold Bond product, Wallboard Casing number 100.
         4) USG product "Dur-A-Bead - number 200A"

B. Control joints: Solid zinc "V-shaped control joint, having 3/32 inch thick perforated grounds.

C. Tapes and compound:
   1. Joint tape (at paper-faced gypsum): Nominal 2 inch wide, high strength, cross-fibered paper drywall tape.
   2. Joint tape (at fiberglass faced gypsum): Nominal 2 inch wide, self-adhering (adhesive backed), fiberglass mesh tape.
   3. Joint Compound for setting paper joint tape: 'Speed-setting type compound', field mixed.
      a. Acceptable products, or approved equal:
         1) USG product "Durabond 20".
         2) Gold bond product "Stay Smooth 30".
         3) Georgia Pacific Gypsum LCC, product "ToughRock All-Purpose Dry Mix"
   4. Joint Compound for finishing: Field mixed joint compound or factory pre-mixed compound.
      a. Field-mixed compounds: acceptable products, or approved equal:
         1) USG product "Durabond 90".
         2) Gold bond product "Stay Smooth 90".
         3) Georgia Pacific Gypsum LCC, product "ToughRock Setting Compound 90".
      b. Factory pre-mixed compounds: acceptable products, or approved equal:
         1) USG product "Ready-Mixed Joint Compound".
         2) Gold bond product "All Purpose Compound".

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3) Georgia Pacific Gypsum LCC, product "ToughRock Ready Mix All-Purpose Compound"

D. Fasteners (interior board systems):
1. Type S, bugle head screws complying with ASTM C 1002, for applying gypsum board to metal framing, ceiling grid system, and furring channels.
   a. Not less than 1 inch long for single layer gypsum board.
   b. Not less than 1-5/8 inch [41mm] long for double-layer gypsum board.
2. Type S-12, fine thread self-drilling screws complying with ASTM C 1002,for applying gypsum board to light gage metal framing.
   a. Not less than 1 inch [25 mm] long for 1/2 inch thick single layer gypsum board.
   b. Not less than 1-1/4 inch [31mm] long for 5/8 inch thick single layer gypsum board.
   c. Not less than 1-5/8 inch [41mm] long for double-layer gypsum board,

E. Ceiling buttons, perforated type, 1 inch diameter, for use at multiple layered gypsum board ceiling systems.

F. Laminating adhesive: Ready mix joint compounds as specified herein above.

G. Joint Sealers (interior acoustical sealant type): One component acrylic latex, permanently elastic, non-staining, non-shrinking, non-migrating and paintable. Acceptable products include the following, or approved equal.
1. Tremco, Beachwood, OH.; product, "Acoustical Sealant".
2. United States Gypsum Company, Chicago, IL.; product "USG Acoustical Sealant".
3. Pecora Corporation, Harleysville, PA.; product " AC-20 FTR".

2.4 SOURCE QUALITY CONTROL

A. Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that all items which are to be enclosed by Work of this Section, have been permanently installed, inspected and approved.

B. Inspect framing and other substrates; verify that they are in proper condition to receive the work of this Section.

C. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

A. During the operation of gypsum board work, protect all wood, metal, glass, flooring, and other finished materials against undue soilage and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged and soiled.

3.3 INSTALLATION - GENERAL

A. General: Perform erection procedures for the various gypsum board system conditions, except as otherwise specified, as set forth in GA 201, GA 216,GA 220, the written instructions of gypsum board manufacturer, together with the additional requirements specified herein and as indicated on the Drawings.

B. Where fire-resistive rated assemblies are indicated, erect gypsum board systems in strict accordance with the manufacturers' UL listed test constructions for the required fire rating on each specific assembly.

C. Install specified control joints where indicated on Drawings and where run of partitions, or furred surfaces exceeds 30 feet. Show locations of all control joints on shop drawings.
1. Locate control joints at corners of head frames of doors.
2. Run vertical control joints continuously to top of partition or furred area, as applicable.

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3.4 INSTALLATION OF GYPSUM BOARD

A. Screw-fasten only, gypsum board to framing and furring, with ends and edges occurring over firm bearing. At all door jambs screw fasten gypsum panels 8 inches on center to both box studs
   1. Erect single layer fire-resistance rated gypsum board vertically.
   2. Erect ceiling and soffit gypsum boards to meet UL requirements, where applicable, stagger end joints over supports. Secure gypsum board with fasteners inserted through ceiling buttons; anchor fasteners directly to framing or suspended support system.

B. Wherever items penetrate the gypsum board surfaces, use extra care in cutting the gypsum board to ensure a uniformly-dimensioned joint between the penetrating item and the gypsum board, and fill joints with specified sealant material. Verify the expected deflection factor of the penetrating members, and cut the gypsum accordingly, to prevent damage thereto from the deflecting members.

C. Installing Trim Accessories:
   1. General: For trim with back flanges intended for fasteners, attach to framing with same screw fasteners used for gypsum board. Otherwise, attach trim according to manufacturer's written instructions.
      a. Nailing, stapling, or crimping methods to install trim components is prohibited.
   2. Install corner beads at all exterior corners of gypsum boards.
   3. Install casings (metal trim) wherever gypsum board meets a dissimilar material, and in other locations indicated on the Drawings, except at floors where bottom of the board will be concealed by base, integral with flooring, resilient base, wood base or carpeted base.

3.5 APPLICATION OF ACOUSTICAL SEALANT

A. General: Install sealant and backing in accordance with the recommendations of ASTM C-919 and sealant manufacturer’s recommendations.
   1. Perform preparation in accordance with C-790. Thoroughly clean all joints, removing all loose mortar, oil, grease, dust, frost, and other foreign materials that will prevent proper adhesion of primers and sealant materials.
   2. If so recommended and furnished by the specific sealant manufacturer, apply primer to all joint surfaces, taking care not to stain adjacent surfaces.

B. Seal all partition perimeters prior to taping or compounding. Where perimeters are edged with metal trim, apply sealant and backing material between trim and dissimilar material.

C. Seal all penetrations in partition types designated for “acoustical” insulation. Penetrations to receive sealant include electrical boxes, plumbing, heating and air conditioning ducts, telephone, intercom hookups and similar items.
   1. Install joint bead back-up in all joints in excess of 5/8-inch depth, and joints that have no back-up therein, placing the joint bead in the joint in a manner that will assure a constant depth 1/8 inch greater than the sealant and caulking material depth tolerances.
      a. Set beads into joints continuously, by slightly stretching during placement, to permit compression against sides of joint, without surface wrinkles or buckles.
      b. Do not stretch back-up material into joints.
      c. Install bond breaker wherever recommended by the sealant manufacturer to prevent bond of the sealant to surfaces where such bond might impair the Work.
   2. Apply sealant in continuous beads without open joints, voids or air pockets
      a. The depth of sealant and caulking materials shall be in accordance with manufacturer's recommendations for the specific joint function, but in no case exceed 1/2-inch in depth, nor less than 1/4-inch, regardless of the joint width.
   3. Remove the temporary masking tape immediately after tooling, and before the sealant or caulking material has taken initial set.

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3.6 APPLICATION OF JOINT TREATMENT

A. Install joint tape at all joints where gypsum boards abut and where boards form internal corners, whether or not such joints will be concealed from view.

B. Apply compound to all joints, edges, corners, fastener head depressions and abrasions in the surfaces, whether or not such conditions will be concealed from view. Sand completely smooth all compound surfaces, which will be exposed to view, and leave ready to receive applied coatings or finish.

C. Provide the minimum levels of gypsum board finishes as defined by the Gypsum Association recommended specifications GA-214 and GA-216, per the following:
   1. At areas hidden from view, except as otherwise specified: Level 1.
   2. At areas hidden from view, requiring a fire resistance rating: Level 1.
   3. At areas hidden from view, requiring smoke-resistance: Level 1.
   4. At areas hidden from view, corridor side of all corridor partitions: Level 1.
   5. At concealed plenum spaces above ceilings attic spaces: Level 1.
   6. At non-occupied spaces (i.e. attics): Level 1.
   7. At surfaces scheduled to receive tile: Level 2.
   8. At surfaces scheduled to receive painted finishes: Level 4.

3.7 TOLERANCES

A. Maximum variation for gypsum board partitions and ceilings from true flatness: 1/8 inch per 10 feet, noncumulative.

3.8 CLEANING

A. Daily clean work areas by sweeping and disposing of debris, scraps, and deposits of compound and gypsum fill.

B. After completion of the work of this Section, remove equipment, and clean all wall, partition, and floor areas free from deposits of gypsum fill, and other materials installed under this Section.

END OF SECTION

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SECTION 095100

ACOUSTICAL CEILINGS

PART 1 – GENERAL

1.1 SUMMARY

A. Furnish and install the following:

1. Suspended acoustical tile ceiling including suspension system and associated edge moldings.

B. Patching acoustical tile ceilings to match existing ceilings where disturbed by demolition and Work of this Contract. This Section includes both concealed and exposed spline ceilings, suspension systems and associated edge moldings.

1. In rooms where existing partitions have been removed, instead of patching, the Contractor shall replace the entire ceiling and suspension system in the room with new.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 024119 - SELECTIVE DEMOLITION: Demolition of work abutting existing ceilings and demolition of existing ceilings for new construction.

E. Section 092216 - NON-STRUCTURAL METAL FRAMING: Metal ceiling and soffit framing for gypsum board, including hanger attachments, wire hangers, and screwable metal tee grid system.

F. Section 092900 - GYPSUM BOARD: Suspended drywall construction ceilings and soffits.

G. Section 079200 - JOINT SEALANTS: Sealant at gaps between new acoustical ceiling edge angles and all irregular walls.

H. Division 21 - FIRE PROTECTION: Sprinkler heads in ceiling system.

I. Division 23 - MECHANICAL: Air diffusion devices in ceiling.

J. Division 26 - ELECTRICAL:

1. Fire alarm and smoke detection equipment mounted in ceiling system.

2. Light fixtures and independent hangers for suspended fixtures.

1.3 REFERENCES

A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM A 641 - Zinc- Coated (Galvanized) Carbon Steel Wire

2. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method "UL Classified".

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3. ASTM C 523 - Light reflectance of Acoustical Material by the Integrating Sphere Reflectometer.
4. ASTM C 635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
5. ASTM C 636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
6. ASTM E 84 - Surface Burning Characteristics of Building Material "UL Classified"
7. ASTM E 119 - Fire Tests of Building Construction and Materials "UL Classified".
8. ASTM E 413 - Classification for Rating Sound Insulation.
9. ASTM E 580 - Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
10. ASTM E 1264 - Classification of Acoustical Ceiling Products.
11. ASTM E 1414 - Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum. "UL Classified".
12. UL Fire Resistance Directory and Building Material Directory.
13. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

B. General References The following reference materials are hereby made a part of this Section by reference thereto:

1. CISCA (Ceilings and Interior Systems Contractors Association) - Acoustical Ceilings: Use and Practice.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

B. Sequencing:

1. Field Measurements:

a. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.

b. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work.

2. Coordinate the work of this Section with the respective trades responsible for installing interfacing work, to allow work which will be concealed by the ceilings to be completed prior to commencing installing the ceilings in such locations.

C. Scheduling:

1. Install acoustical units after interior wet work is dry.
2. Schedule work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead work is completed, tested and approved.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 – ADMINISTRATIVE REQUIREMENTS:

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1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.

2. Shop Drawings:
   a. 1/4 inch scale plans of each room or space; indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to the system.
   b. All drawings bearing dimensions of actual measurements taken at the project.
   c. Large scale installation details of special conditions.

3. Verification Samples:
   a. 12 by 12 inch samples of acoustical units, illustrating material and finish.
   b. 12 by 12 inch samples of existing acoustical units for comparison with supplied materials.
   c. 12 inch long samples of suspension system components including main runners, cross runner and edge trim.
   d. 12 inch long samples of existing exposed spline suspension system components including runners and edge trim for comparison with supplied materials.

B. Closeout Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

1. Bonds and Warranty Documentation:
   a. Manufacturer’s Warranties and guarantees as specified elsewhere herein this Section.

C. Maintenance Material Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS. Clearly label and package extra materials securely to prevent damage.

1. Provide to the Owner, extra ceiling panels: 3 percent of each type installed.

2. Provide to the Owner, extra suspension components: 3 percent of each type installed.

3. Provide to the Owner, all extra salvaged ceiling panel and suspension components which have not been utilized in the Work.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Obtain products required for the Work of this Section from a single manufacturer, or from manufacturers recommended by the prime manufacturer of acoustical ceiling panels.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.

2. Do not deliver acoustical ceiling panels to the project until all concrete, masonry, plaster and other wet work has been completed and dry.

3. Deliver acoustical ceiling panels in original, unopened packages and store protected in a fully enclosed space.

B. Storage and Handling Requirements:

1. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.

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C. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or show other evidence of damage, unless Architect specifically authorizes correction thereof and usage on project.

1.8 SITE CONDITIONS

A. Maintain uniform temperature of minimum of 60 degrees Fahrenheit and humidity of 20 to 40 percent prior to, during, and after installation.

1.9 WARRANTY

A. General: Submit warranties under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

B. Manufacturer Warranty:

1. The Contractor shall obtain in the Owner's name the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities which the Contractor may have by law or other provisions of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specified Manufacturer: To establish a standard of quality, design and function desired, Drawings and specifications have been based on products specified in the following Articles. No substitutions will be accepted.

1. Acoustical ceiling panels:
   a. Basis of Design: CertainTeed Corporation, Valley Forge, PA.
   b. Armstrong World Industries, Inc., Lancaster, PA.
   c. USG Interiors Inc., Chicago, IL.
2. Suspension system:
   a. Basis of Design: CertainTeed Corporation, Valley Forge, PA.
   b. Armstrong World Industries, Inc., Lancaster, PA.
   c. USG Interiors Inc., (Donn®) Chicago, IL.

2.2 ACOUSTICAL CEILING PANELS AND SUSPENSION SYSTEM

A. **ACT-1**: CertainTeed Ceilings, product "Symphony *m* 1222BB-1OF-1", with the following characteristics:

1. Size: 24 by 24 inches.
2. Thickness: 3/4 inches.
3. Edge: Reveal Beveled for 15/16 inch grid.
4. ASTM E1264 classification: Type: IV, Form: 2, Pattern E.
5. Mold/Mildew inhibitor: BioShield.
6. Finished Surface Color: White.
7. Core Composition: Wet-felted mineral fiber.
8. Recycled Content: 62%.
9. Performance Criteria:
   a. Noise Reduction Coefficient (NRC) per ASTM C423 (E-400 mounting): 0.70.

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b. Light Reflectance (LR) per ASTM E1477: 0.90.
c. Ceiling Attenuation Class (CAC) per ASTM E1414: 33.
d. Flame Spread Classification per ASTM E84: Class A.

B. **ACT-2**: CertainTeed Ceilings, product "Performa VinylShield A 1102-CRF-1", with the following characteristics:

1. Size: 24 by 24 inches.
2. Thickness: 5/8 inches.
3. Edge: Square/Trim.
4. ASTM E1264 classification: Type: X, Form: NA, Pattern G.
5. Mold/Mildew inhibitor: BioShield.
6. Finished Surface Color: White.
7. Core Composition: Wet-felted mineral fiber.
8. Recycled Content: 41%.
1. Performance Criteria:
   a. Noise Reduction Coefficient (NRC) per ASTM C423 (E-400 mounting): NA.
   b. Light Reflectance (LR) per ASTM E1477: 0.78.
   c. Ceiling Attenuation Class (CAC) per ASTM E1414: 39.
   d. Clean Room Classification per ISO 14644-1: Class 5.

2.3 SUSPENSION SYSTEM

A. **ACT-1**: 15/16 inch Classic Stab grid system.

B. **ACT-2**: 15/16 inch clean room gasketed grid system.

C. Attachment Devices: Anchors sufficient for five-times design load indicated in ASTM C635 (Table 1). Wire for hangers of size and type to suit intended application, complying with ASTM C641, Class 1 zinc coating, not less than 12 gauge.

D. Sealant as specified in Section 079200 – JOINT SEALANTS:
1. Joint Sealer Type AP, (Acrylic painters caulk).
2. Joint Sealer Type SP, (Silicone, Paintable all purpose).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.

1. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

A. Protection of In-situ Conditions: During the operation of work of this Section, protect existing finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing materials which are soiled or otherwise damaged by Work of this Section, to match original profiles and finishes. Existing materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work to match existing.

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B. Surface Preparation:

1. Carefully examine all receiving surfaces, to which attachments will be made hereunder, and determine the most practical way of making such attachments. Request Architect's approval of any attachment method which differs from that indicated on the approved shop drawings before proceeding with installation.

2. Permit acoustical ceiling tile to reach room temperature and a stabilized moisture content prior to installation.

C. Existing Acoustical Ceilings to be Salvaged or Patched:

1. Where existing ceilings are disturbed by the work of this Contract and are not scheduled to be replaced with new ceilings; remove ceilings including suspension system, as required. Remove only that portion of the acoustical materials and suspension system as is necessary for the required work. Coordinate with all trades to determine the extent of area to be removed.

2. Store materials in a neat manner and protect from damage and after all related work has been completed, reinstall the existing ceiling materials.

3. Where acoustical panels, acoustical tiles and suspension system have been removed because of new construction and cannot be reinstalled, install new material to match existing. All materials to be used for patching and matching shall be approved by the Architect in advance of work.

3.3 INSTALLATION

A. Locate system on room axis, leaving equal sized border units of not less than one-half tile width.

B. Install all components of the suspended grid systems in accordance with the manufacturer's instructions, the approved shop drawings, conforming to ASTM C-636 requirements. Ensure a deflection not to exceed 1/360 span of 48-inch simple span.

C. Install specified edge moldings wherever ceilings intersect a wall or partition surface, and around all items having any dimension of 4 inches or more which penetrate the ceilings, including circular penetrations. Set moldings absolutely level, using as long lengths as practicable, and secure with fasteners recommended by manufacturer for the type of substrate.

1. Sealant Bed: Apply continuous ribbon of acoustical sealant (type AA specified under Section 07 92 00), concealed on back of vertical leg before installing moldings.

2. Screw-attach moldings to substrate at intervals not over 16 inches on center. and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12'-0". Miter corners accurately and connect securely.

D. Install hanger attachments to overhead construction in accordance with the approved shop drawings, spacing the attachments not more than 48 inches on centers over location of each main tee member.

1. Aluminum Suspension Systems: Provide hangers spaced not more than 30 inches on center in each direction and not more than 8 inches from ends

2. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers to span the extra distance.

3. Install hanger wire to attachments with triple twists.

E. Install main tees parallel to the long dimension of each area, spacing the tees 48 inches on centers. Secure the bottom of hanger wires through slots in the main tee members and tie with triple twists. Level the main tees as the work progresses.

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F. Uniformly space the cross tees at 24 inches on centers, and secure the cross tees into the main tees as recommended by the system manufacturer.

G. Fit acoustical ceiling tile units in place, free from damaged edges or other defects detrimental to appearance and function. Install acoustical ceiling tile level, in uniform plane, and free from twist, warp or dents.

1. Field cut square edged type tile neatly at 90 degree angles at all edge conditions, and touch up with coating as described in Section 099123 – INTERIOR PAINTING SCHEDULE.

2. Field cut tegular type tile with a tegular reveal at all edge conditions, and touch up with coating as described in Section 099123 – INTERIOR PAINTING SCHEDULE.

3. Where required by governmental agencies having jurisdiction, install retention clips, provide two clips per ceiling panel installed on opposite sides of panel.

3.4 TOLERANCES

A. Maximum variation from flat and level surface: 1/8 inch in 10 feet.

B. Maximum variation from plumb of grid members caused by eccentric loads: 2 degrees.

3.5 CLEANING

A. Properly clean surfaces of panels and open grids free from dirt and handling marks. Wherever surfaces cannot be cleaned by normal methods or have defects, remove and replace with new components.

B. Clean work under provisions of Section 017300 – EXECUTION.

3.6 PROTECTION

A. Protect finished work under provisions of Section 015000 - TEMPORARY FACILITIES AND CONTROLS.

END OF SECTION

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SECTION 096513

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Prepare substrate to receive resilient base.

B. Furnish and install the following:

1. Coved resilient base as indicated.
2. Straight resilient base as indicated.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 015000 - TEMPORARY FACILITIES AND CONTROLS: Application of protection paper to finished resilient flooring.

C. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

D. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

E. Section 024119 - SELECTIVE DEMOLITION: Removal of existing finishes.

F. Section 090506 - COMMON WORK RESULTS FOR FLOORING: General requirements for flooring preparation, installation and temporary protection

G. Section 093000 - TILING: Ceramic tile and marble thresholds.

H. Section 096513 - RESILIENT BASE AND ACCESSORIES: Resilient base.

I. Section 096516 - RESILIENT TILE FLOORING: Vinyl flooring.

J. Section 096516 - RESILIENT SHEET FLOORING: Sheet vinyl flooring and integral base.

1.3 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions.
   a. Include certification of data indicating Volatile Organic Compound (VOC) content of all adhesives. Submit MSDS highlighting VOC limits.
2. Selection Samples: Manufacturers' sample chain of colors available for selection by the Owner’s Project Manager and the Architect.
3. Verification Samples: Each type resilient base and color selected, 24 inches long.

B. Maintenance Material Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS. Clearly label and package extra materials securely to prevent damage.

1. Extra Stock Materials: Upon completion of the Work of this Section, deliver to the Owner extra materials for future repairs and maintenance, an amount equal 24 linear feet for each color and type of resilient base installed.

1.4 QUALITY ASSURANCE

A. General: Avoid color and pattern differential; provide base from one production run in any single room or contiguous areas.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Basis of Design: Johnsonite, Chagrin Falls, OH.
2. Roppe Corporation, Fostoria, OH.
3. Tarkett, Inc., Parsippany, NH.

2.2 DESCRIPTION

A. Regulatory Requirements:

1. Provide materials and assemblies conforming to applicable building codes and regulatory agencies for flame/fuel/smoke rating requirements of base trim in accordance with ASTM E 84.

2.3 RESILIENT BASE

A. Rubber Base: 4 inches high, ribbed back, 1/8 inch thick, rounded top complying with ASTM F-1861, Type TP, Thermoplastic Rubber (TBR). Colors shall be as selected by the Architect from the manufacturer's full available range of options. Rubber base shall be furnished in continuous lengths, approximately 100 feet long.

1. Straight resilient base at carpeted areas.
2. Coved resilient base at resilient flooring.

B. Base accessories: Pre-molded end stops of same material, size and color as base. Job-form all external and internal corners from base material, pre-molded corner pieces will not be acceptable.

1. All wall base shall be coil product. Products that come in straight lengths are not acceptable.

2.4 ACCESSORIES

A. Adhesives: General: Water resistant, low VOC, acceptable to the resilient flooring manufacturer, for substrate conditions. Base Adhesives: Maximum VOC 50 [gIL less water]

1. Acceptable manufacturers:
   a. Advanced Adhesive Technology, Inc, Dalton GA, product: "No. 432 Modified Acrylic Cove Base Adhesive".
   b. DAP Incorporated, Dayton OH, product: "Cove Base Construction Adhesive".
   c. W.W. Henry Company, Aliquippa PA., product: "Henry 440 Cove Base Adhesive".
   d. Roberts Consolidated Industries, Inc., City of Industry, CA, product: "Premium Solvent-Free Cove Base Adhesive".

B. Joint Sealer for between the top of wall base and irregular wall surfaces: Plastic filler as recommended by manufacturer.

C. Cleaning material: Domestic neutral floor detergent having a pH 7 or pH 8, as recommended by the flooring manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install all products in strict accordance with each manufacturer's written installation procedures and other provisions specified herein.

B. Spread only enough adhesive to permit installation of materials before initial set.

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C. Install Resilient base: Install base on solid backing, bond to vertical substrate with continuous contact at horizontal and vertical surfaces. Apply wall base to walls, columns, casework and other permanent fixtures in areas where base is required.

1. Install in lengths as long as practical.
2. Scribe to fit to door frames and other interruptions.
3. Form all external and internal corners in accordance with manufacturer's written instructions. Cope inside corners and fit neatly.
4. Fill voids with plastic filler along the top edge of the resilient wall base on masonry surfaces or other similar irregular substrates.

END OF SECTION

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SECTION 096516

RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this Section consists of resilient tile flooring where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.

B. Furnish and install the following:

1. Sheet vinyl flooring and integral base.
2. Vinyl transition strips wherever edges of vinyl composition flooring materials abut dissimilar flooring, where no thresholds occur.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 015000 - TEMPORARY FACILITIES AND CONTROLS: Application of protection paper to finished resilient flooring.

C. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

D. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

E. Section 090506 - COMMON WORK RESULTS FOR FLOORING: General requirements for flooring preparation, installation and temporary protection.

F. Section 096513 - RESILIENT BASE AND ACCESSORIES: Vinyl base and accessories at sheet flooring.

G. Section 096519 - RESILIENT TILE FLOORING: Vinyl composite tile flooring and accessories.

1.3 SUBMITTALS

A. Submit the following under provisions of Section 013000 – ADMINISTRATIVE REQUIREMENTS:

1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for each item furnished hereunder.
   a. Furnish manufacturer’s product literature on flooring adhesive, highlight adhesive properties, including VOC’s and maximum moisture pressure limits for substrates.
2. Submit the manufacturer’s certification that the resilient flooring has been tested by an independent laboratory and complies with the required fire tests.
3. Shop drawings: 1/4 inch scale plans of each flooring area scheduled for Work of this Section; indicate layout of patterns, identify selected colors and patterns, show location of welded seams and joints with abutting materials. Drawings shall bear dimensions of actual measurements taken at the project.
4. Verification Samples:
   a. Sheet flooring: 12 inch by 12 inch illustrating color and pattern for each color and type of flooring selected.
   b. Edging and transition strips: 12 inches long demonstrating profile, thickness, size, and color.

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1.4 QUALITY ASSURANCE

A. Provide each type of resilient sheet flooring and accessories from one manufacturer, including leveling and patching compounds, and adhesives, or as recommended by primary manufacturer of flooring.

B. Avoid color and pattern differential; provide flooring from one production run in any single room or contiguous areas.

1.5 WARRANTY

A. Submit manufacturer's standard wear warranties for all flooring materials under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. To establish a standard of quality, design and function desired, Drawings and specifications have been based on the products and materials specified in the following Articles.

2.2 SHEET VINYL FLOORING

A. Basis of Design: Johnsonite, product "iQ Optima homogeneous vinyl sheet flooring, consisting of the following:

1. Color: As selected by Architect.
2. Size: As indicated on the Drawings.
3. Complies with requirements for ASTM F 1913 Standard Specification for Vinyl Sheet Floor Covering Without Backing.
4. Construction: no wax, no finish for life of product.
5. Wear layer/Overall thickness: .080" (2.0 mm).
6. ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring of 0.6 or greater.
7. ASTM F 970, Standard Test Method for Static Load Limit – 250 PSI.
8. ASTM E 648, Standard Test method for Critical Radiant Flux of 0.45 watts/cm2 or greater, Class I.
9. Contains 25% pre-consumer recycled content.
10. 100% Recyclable.
11. NSF-332 Platinum Certified.
12. Phthalate-free (except for recycled material).

B. Transitions between carpet and sheet vinyl shall use shall use a Shulter "Schiene" strip.

1. If products are not the same height, flooring shall be feathered out so finish flooring is flush with top of metal edge strip.

C. Welding Rods: Solid color welded rods matching flooring, as recommended by manufacturer.

D. Filler for patching, smoothing and leveling subfloors and underlayments: Portland cement-based latex underlayment acceptable to flooring manufacturer, equal to the following:

1. Ardex, Inc., products "Feather Flash" and "Ardex SD-P".
2. Quikrete Companies, product "Fast-Set Underlayment 1248".
3. Silpro Masonry Systems Inc., product "Profinish".

E. Adhesives and primers: Latex based, non-flammable in wet state, with NFPA, Class A rated, VOC compliant, as recommended by the resilient flooring manufacturer for the substrate and application intended.

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F. Transition strips: Homogeneous vinyl, of profiles required for thickness of abutting materials, in colors as selected by the Architect.

G. Cleaning material: Domestic floor detergent, as recommended by the flooring manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Install all products in strict accordance with each manufacturer's written installation procedures and other provisions specified herein.

B. Install resilient flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install resilient flooring over concrete slabs until they have been cured and are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture test.

C. Spread only enough adhesive to permit installation of materials before initial set.

3.2 INSTALLATION - SHEET VINYL FLOORING

A. Install sheet vinyl using conventional full-spread method and heat welded seams. Application shall be performed by factory trained mechanics franchised by the manufacturer in accordance with the manufacturer’s instructions, and using tools and techniques recommended by the flooring manufacturer.

B. Cut sheet material into required lengths and sizes. Layout and cut to achieve minimum number of seams and for pattern match between abutting edges, Reverse every other sheet (if recommended by manufacturer)

1. Seams in corridors shall run perpendicular to corridor.

C. Lay cut sheets flat and allow to come to room temperature prior to installation.

D. Lay sheet vinyl flooring so as to ensure full uniform contact with substrate and to produce finished surfaces which are smooth, even and in true planes, free of buckles, waves, and other imperfections.

E. Install the sheets and roll the floor surface to work wrinkles and air pockets out past the outer edges.

1. Roll with a 100-pound (45.36 kilogram) roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer

F. Fit the sheet vinyl neatly and tightly into breaks and recesses, against bases, around pipes and penetrations, under saddles and thresholds, and around permanent cabinets and equipment.

G. Weld seams with welding rods, as recommended by flooring manufacturer. When routing for seams, do not rout or groove through the flooring. Check temperature and speed of application to prevent charring, replace all damaged flooring. Weld seams in two pass method to prevent concave seaming. Use trim plates or sleds when making trimming first pass seam, use sharpened tools with second pass, trimming in a smooth continuous motion, resulting in a smooth seam.

H. Provide integral base where scheduled on Drawings or Finish Legend.

1. Flash sheet vinyl flooring up the walls forming an integral coved base at wall surfaces. The height of the base at walls shall be 6 inches unless otherwise indicated on the drawings.

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2. Install continuous coved fillet strip behind sheet vinyl at the intersection of vertical surfaces and floor surfaces for walls and casework; cut, fit, and miter-weld at internal and external corners.
3. Install continuous vinyl cap strip at top edge of sheet vinyl base at walls; securely fastened in place, with top edge of trim level, and with all trim joints mitered. Cap strip will not be required at underside of toe space.
4. Install integral base at sides and at toe space of cabinets. The height of the integral base at casework shall match that of the toe space.
5. All interior and exterior corners of the integral base shall be formed without hardware.

I. Install reducer strips wherever new resilient sheet flooring terminates at carpeting and elsewhere as required to terminate flooring.

3.3 INSTALLATION OF ACCESSORIES

A. Resilient edge and transition strips:
1. Install edge strips at all edges of flooring which would otherwise be exposed.
2. Place resilient edge strips tightly butted to flooring and secure with adhesive recommended by the edge strip manufacturer.

END OF SECTION

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SECTION 096519

RESILIENT TILE FLOORING

PART 1 – GENERAL

1.1 SUMMARY

A. The work of this Section consists of resilient tile flooring where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.

B. Furnish and install the following:

1. Vinyl Composition Tile (VCT) flooring.
2. Rubber transition strips wherever edges of resilient tile flooring materials abut dissimilar flooring, where no thresholds occur.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 015000 - TEMPORARY FACILITIES AND CONTROLS: Application of protection paper to finished resilient flooring.

C. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

D. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

E. Section 024119 - SELECTIVE DEMOLITION: Removal of existing and wall base.

F. Section 096516 - RESILENT SHEET FLOORING: Sheet vinyl flooring.

G. Section 090506 - COMMON WORK RESULTS FOR FLOORING: General requirements for flooring preparation, installation and temporary protection

H. Section 096513 - RESILIENT BASE AND ACCESSORIES: Resilient base at tile flooring.

I. Section 096516 - RESILIENT SHEET FLOORING: Sheet vinyl flooring and integral base.

1.3 REFERENCES

A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM E 84 - Surface Burning Characteristics of Building Materials.
2. ASTM F-710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
3. ASTM F-1066 - Vinyl Composition Floor Tile.
4. ASTM F-1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
5. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.
6. NFPA 253 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

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7. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate work of this Trade Contract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

2. Coordinate the work of this Section with the respective trades responsible for installing interfacing work.

B. Sequencing:

1. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Trade Contract, have been received and approved by the Architect.

2. Sequence work to ensure resilient flooring is not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, wet work is dry and cured, and work overhead is completed.

3. Ensure that installation of flooring and accessories occurs after other finishing operations, including painting.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 – ADMINISTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties and installation instructions for each item furnished hereunder.

a. Furnish manufacturer’s product literature on flooring adhesive, highlight adhesive properties, including VOC’s and maximum moisture pressure limits for substrates.

2. Shop drawings: 1/4 inch scale plans of each flooring area scheduled for Work of this Section. Drawings shall bear dimensions of actual measurements taken at the project.

a. Identify each flooring type, colors and patterns, indicate layout of tile units and direction of tile patterns, (seaming diagram).

b. Where more than one adhesive type is specified or otherwise required by flooring manufacturer, identify on shop drawings areas for each adhesive type.

3. Selection samples: Manufacturers' sample chain of colors and patterns available for selection by Architect.

4. Verification samples:

a. Full sized flooring tile, illustrating color, and pattern for each color and type of tile selected.

b. Edging: 12 inches long demonstrating profile, thickness, size and color.

5. Certificates:

a. Submit the manufacturer’s certification that the resilient flooring has been tested by an independent laboratory and complies with the required fire tests.

B. Closeout Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

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1. Operation and Maintenance Data: Furnish cleaning and maintenance data.
2. Bonds and Warranty Documentation:
   a. Manufacturer's Warranties and Guarantees as specified elsewhere herein this Section.

C. Maintenance Material Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS. Clearly label and package extra materials securely to prevent damage.

1. Extra Stock Materials: Upon completion of the Work of this Section, deliver to the Owner extra flooring materials for future repairs and maintenance, from the same manufacturing runs as those installed, in the following amounts.
   a. Vinyl composition tile: 3 percent of each material in each color, and pattern installed.
   b. Furnish a quantity of adhesive of each type used in sealed cans or containers sufficient to apply the above materials.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

1. Provide types of resilient tile and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.
2. Avoid color and pattern differential; provide flooring from one production run in any single room or contiguous areas.

1.7 FIELD MOCK-UPS

A. Provide field mock-up areas using accepted paint colors, minimum 50 square feet, illustrating color, texture and finish, and demonstrating the minimum standard for the Work.

B. Locate field mock-ups where directed and include all surfaces and materials scheduled to receive a field applied finish.

C. Maintain field mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.

D. Accepted field mock-ups may remain as part of the work; the number of mock-ups shall not be restricted.

1.8 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
2. Deliver resilient flooring materials in original, unopened packages and store protected for three days prior to installation in area of installation to achieve temperature stability.

B. Storage and Handling Requirements:

1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets. Store materials in a clean dry, enclosed space off the ground and protected from the weather
2. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.

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3. Protect adhesives from freezing.

1.9 SITE CONDITIONS

A. Maintain uniform temperature of minimum of 65 degrees Fahrenheit and humidity of 20 to 40 percent 48 hours prior to, during, and 48 hours after installation. Store resilient flooring materials and accessories in the spaces where they will be installed for at least 48 hours before beginning installation. Thereafter, maintain a minimum temperature of 55 degrees Fahrenheit in the areas where the work is completed.

1.10 WARRANTY

A. General: Submit warranties under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

B. Manufacturer Warranty: provide manufacturer's standard wear warranties for all flooring and stair tread materials installed under this Section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. To establish a standard of quality, design and function desired, Drawings and specifications have been based on the products and materials specified in the following Articles.

2.2 VINYL COMPOSITION TILE FLOORING

A. Basis of Design: Johnsonite Tarkett, product "Azrock TEXTILE" Resilient Vinyl Composition Tile Flooring with the following physical characteristics:

1. Color: As selected by Architect.
2. Size: 12 by 24 inches (30.5 cm x 61 cm).
3. Complies with requirements for ASTM F 1066, Class 2 (Through Pattern) Standard Specification for Vinyl Composition Floor Tile.
4. Wear layer/Overall thickness: 1/8 inch (3.2 mm).
5. ASTM D 2047, Standard for Static Coefficient of Friction, Minimum 0.5 SCOF (ADA Compliant).
6. ASTM F 970, Standard Test Method for Static Load Limit - 150 PSI.
7. ASTM E 648, Standard Test method for Critical Radiant Flux of 0.45 watts/cm2 or greater, Class I.

2.3 ACCESSORIES

A. Filler for patching, smoothing and leveling subfloors and underlayments: Portland cement-based latex underlayment acceptable to flooring manufacturer, equal to the following:

1. Ardex, Inc., products "Feather Flash" and "Ardex SD-P".
2. Quikrete Companies, product "Fast-Set Underlayment 1248".
3. Silpro Masonry Systems Inc., product "Profinish".

B. Adhesives:

1. General: Water resistant, acceptable to the resilient flooring manufacturer, for substrate conditions.

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C. Transition and edge strips:

1. Transitions between carpet and VCT shall use shall use a Shulter “Schiene” strip. If products are not the same height, flooring shall be feathered out so finish flooring is flush with top of metal edge strip.

2. Cleaning material: Domestic neutral floor detergent having a pH 7 or pH 8, as recommended by the flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.

1. Verify concrete substrate has been cured and is sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture test.

a. Insure that concrete substrate has a moisture content of not more than 3.5 percent by weight. Perform moisture test in several locations using carbide method dampness meter.

2. Beginning of installation means acceptance of existing substrate and site conditions.

3.2 PREPARATION

A. General: Comply with flooring manufacturer's requirements for preparation of substrate to receive resilient flooring.

1. Close spaces to traffic during the installation of the flooring.

B. Protection of In-situ Conditions: During the operation of work of this Section, protect surrounding materials and finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing surfaces which are soiled or otherwise damaged by Work of this Section, to match indicated profiles and specified finishes. Materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work in conformance with the Contract Documents.

C. Surface Preparation:

1. Remove by mechanical means (light sanding and grinding), all protruding edges, high spots. Ensure that substrate is free from paint, varnish, wax, oil, or other foreign matter. Do not use solvents.

2. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler. Apply, trowel and float finish subfloor filler and leave a smooth, level, hard surface. Prohibit traffic from area until filler is cured.

3. Apply troweled subfloor filler and leveler to provide finished concrete surface smooth, with no more than 1/8 inch variation from plane within 10 feet in any direction.

a. Prohibit traffic until filler and leveler is cured.

4. Vacuum clean substrate, and ensure that substrate is dry, clean and smooth prior to application of flooring.

3.3 INSTALLATION - GENERAL

A. Install all products in strict accordance with each manufacturer's written installation procedures and other provisions specified herein.

1. Apply primers as recommended by adhesive manufacturer's written instructions.

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B. Spread only enough adhesive to permit installation of materials before initial set.

C. Mix tile to ensure that concentration of surface patterns is uniform throughout. Use tile from cartons in same sequence as manufactured and packaged, if so numbered.

D. Maintain reference markers, holes and openings that are in place or have been marked for future cutting; repeat markers on flooring as marked on substrate. Use non-permanent marking devices which may be cleaning washed off when no longer required.

3.4 INSTALLATION - FLOOR TILE

A. Lay flooring in a square grid pattern, with joints and seams parallel to building lines. Lay tile flooring in pattern as indicated on the drawings with pattern-grain running in singular direction. Lay tile with joints straight and continuous in both directions and with border tile not less than 1/2 the width of the tile.

B. Neatly fit resilient materials to all intersecting surfaces, and make joints as inconspicuous as possible.

C. Terminate flooring at centerline of door in closed position where adjacent floor finish is of different material or color.

D. Apply resilient materials to have uniform contact with receiving surfaces throughout, with tight joints, and with all finish surfaces smooth, in true plane, free from buckles, waves, and other imperfections.

E. Extend resilient flooring to wall lines beneath all movable equipment and movable casework. Fit resilient flooring onto breaks and recesses, against non-resilient bases, around pipes and other protrusions, under saddles, and to and around other fixed surfaces, making neat cuts in the flooring and minimizing joints.

3.5 INSTALLATION OF ACCESSORIES

A. Resilient edge and transition strips:

1. Install edge strips at all edges of flooring which would otherwise be exposed.

2. Place resilient edge strips tightly butted to flooring and secure with adhesive recommended by the edge strip manufacturer.

3.6 PROTECTION

A. General: Protect finished work under provisions of Section 015000 - TEMPORARY FACILITIES AND CONTROLS.

B. Prohibit traffic on finished floor areas until flooring adhesive has fully set.

C. Prohibit washing, scrubbing or other similar ‘wet’ operations to occur on finished floor areas for a minimum period of 5 calendar days after installation.

D. Provide protection of completed flooring areas from construction traffic until Final Completion of the General Contract. After cleaning and polishing, cover all resilient tile floor surfaces with non-staining heavyweight kraft paper and overlay with red-rosin paper, taping the edges to maintain position of the protection paper. Reapply papers as required to maintain floor protection.

END OF SECTION

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SECTION 098100

ACOUSTICAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this Section consists of acoustical insulation where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Work includes, but is not limited to the following.

B. Furnish and install:

1. Acoustical insulation as scheduled and where indicated.

1.2 RELATED REQUIREMENTS

A. Section 024119 - SELECTIVE DEMOLITION: Removal of existing partitions, walls and related insulation.

B. Section 061000 - ROUGH CARPENTRY: Wood framing, blocking, nailers.

C. Section 072100 - THERMAL INSULATION.

D. Section 092216 - NON-STRUCTURAL METAL FRAMING.

E. Section 092900 - GYPSUM BOARD: Installation of wall board over acoustical insulation.

F. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Ductwork and piping insulation.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM C 518 - Thermal Transmission Properties by Means of the Heat Flow Meter.

2. ASTM C 553 - Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

3. ASTM C 665 - Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

4. ASTM E 84 - Surface Burning Characteristics of Building Materials.

5. ASTM E 96 - Water Vapor Transmission of Materials.

1.4 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000 – ADMINSTRATIVE REQUIREMENTS:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.

2. Certificates:

a. Provide manufacturer’s written certification of recycled glass content in glass fiber acoustical insulation.

b. Provide manufacturer’s written certification of recycled slag content in mineral wool insulation.

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1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

2. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.

B. Storage and Handling Requirements:

1. Store materials under cover and in manner to keep them dry, protected from weather, direct sunlight and damage from construction traffic and other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering similar products include the following:

1. Acoustical glass fiber insulation:
   a. CertainTeed Corporation, Valley Forge, PA.
   b. Johns Manville Building Insulation, Denver, CO
   c. Owens Corning Fiberglas Corp., Toledo, OH.
   d. (Goldline brand) Schuller International, Inc., Denver, CO.
   e. USG Corp./ USG Interiors Inc., Chicago, IL.

2. Acoustical mineral fiber insulation:
   a. Fibrex Insulations Inc., Sarnia, Ontario.
   b. Thermafiber Inc., Wabash, IN.
   c. Roxul, Inc., Milton, Ontario, (formerly Rock Wool Manufacturing Company).

2.2 MATERIALS

A. Acoustical batt insulation, (for rated assemblies): Mineral wool fiber insulation batts, conforming to ASTM C665 Type 1, and ASTM C553 with a nominal density of 2.5 pounds per cubic foot, nominally 3-1/2 inches thick.

1. Flame Spread Classification: Class A (less than 25, per testing by NFPA 255, ASTM E-84 or UL 723).

2. Recycled content of slag in mineral wool insulation: Use maximum available percentage of material (slag). Mineral wool insulation products incorporated into the work shall contain not less than 75 percent of recycled material (slag) by weight.

3. Acceptable products include:
   a. Fibrex Insulations Inc. product: “Fibrex Sound Attenuation Fire Batt (SAFB)”.
   b. Roxul, Inc., product “Roxul AFB”.
   c. Thermafiber, Inc. product “Thermafiber SAFB”.

4. 6 inch batt acoustical insulation shall be used in the mezzanine drywall ceiling enclosures at 5th floor toilet drains, (2 total).

B. Acoustical batt insulation , (for non-rated assemblies): Unfaced glass fiber insulation nominal 3-1/2 inches [89mm] thick conforming to ASTM C-665 Type I, of width appropriate for spacing of framing or furring members with which used.

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1. Flame Spread Classification: Class A (less than 25, per testing by NFPA 255, ASTM E 84 or UL 723).

2. Recycled content of glass in glass-fiber insulation: Use maximum available percentage of recycled glass. Fiber glass insulation products incorporated into the work shall contain not less than 20 percent of recycled glass cullet.

2.3 ACCESSORIES

A. Staples, tape, adhesives and fasteners required for the proper and complete installation for work of this Section shall be as recommended by each respective manufacturers of each insulation type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install insulation in accordance with insulation manufacturer's instructions.

B. Install in interior walls, and ceiling spaces where indicated. Trim insulation neatly to fit spaces. Fit insulation tight in spaces. Leave no gaps or voids.

3.2 CLEANING

A. Daily clean work areas by sweeping and disposing of debris and scraps.

B. Upon completion of the work of this Section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

END OF SECTION

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SECTION 099100

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This Section consists of painting work where shown on the Drawings, as specified herein, and as required for a complete and proper installation. Painting work includes, but is not limited to, the surface preparation and application of coated finishes, and subsequent touch-up, of interior items and surfaces as indicated on the Contract Drawings and as scheduled herein.

B. Surfaces and Materials: In general, without limiting the generality thereof, the following surfaces, fixtures and equipment require a painted finish:

1. New gypsum board partition and wall surfaces, ceilings and soffits, including all surfaces disrupted and repaired in the process of installing new building systems and components.
2. Metal doors and frames.
3. Interior wood trim.
4. Access panels and frames.

C. DO NOT PAINT the following surfaces and materials.

1. Concealed from view surfaces, except as indicated otherwise in the Contract Documents or as specified herein.
2. Chrome or nickel plating, stainless steel, bronze, brass.
3. Aluminum other than mill finished or factory primed.
4. Factory finished mechanical and electrical equipment, pumps, machinery and similar items which occur in mechanical, storage or equipment rooms or areas.
5. Factory finished materials, specialties, and accessories unless otherwise specified.
6. Ceramic tile, acoustical tile, resilient flooring, and other integrally finished floor, wall and ceiling finishes.
7. Prefinished millwork items.
8. Fire resistant testing and certification labels, code required labels, safety warning labels, performance rating plates, nomenclature plates, identification plates, and similar other labels.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 062000 - FINISH CARPENTRY: Wood trim items, setting and filling of nails, sanding of wood trim.

E. Section 079200 - JOINT SEALANTS: Requirements for sealant and backing materials.

F. Section 081113 - HOLLOW METAL DOORS AND FRAMES: Shop priming of metal frames and steel doors.

G. Section 083100 - ACCESS DOORS AND PANELS: Shop primed access panels, occurring in partitions and walls.

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H. Section 092900 - GYPSUM BOARD: Drywall partitions, ceilings and soffits, including join. treatment and sanding.

I. Document 099123 - INTERIOR PAINTING SCHEDULE:
   1. Painting schedule for interior surfaces and materials.
   2. Painting schedule for Mechanical and Electrical Equipment.

J. Section 104400 – FIRE PROTECTION SPECIALTIES: Shop priming of cabinet doors and frames; shop finishing of cabinet.

K. Division 22 - PLUMBING: Prefinished items such as plumbing fixtures, sprinkler heads, convectors, anemostates and similar surfaces and materials.

L. Division 26 - ELECTRICAL: Prefinished items such as light fixtures, switch gear, electrical distribution cabinets and similar surfaces and materials.

1.3 REFERENCES

A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.
   1. ANSI/ASTM D 16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
   2. ASTM D 2016 - Test Method for Moisture Content of Wood.
   3. All applicable federal, state and municipal codes, laws and regulations for flammability and smoke generation of interior finishes.

B. Definitions:
   1. "Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials specified herein, whether used as prime, intermediate or finish coats.
   2. Sheen: Specular gloss readings in accordance with ASTM D52.
      a. Flat: less than 5 (measured at 85 degrees).
      b. Eggshell: 5 – 20 (measured at 60 degrees).
      c. Satin: 15-35 (measured at 60 degrees).
      d. Low Luster: 25 – 35 (measured at 60 degrees).
      e. Semi-Gloss: 30 -65 (measured at 60 degrees).
      f. Gloss: 65 or more (measured at 60 degrees).

1.4 SUBMITTALS

A. Submit the following under provisions of Section 013000 – ADMINISTRATIVE REQUIREMENTS:
   1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties, material compositions, and application instructions for all finishing products to be applied hereunder.
      a. Include certification of data indicating Volatile Organic Compound (VOC) content of all paint materials.
   2. Samples:
      a. Manufacturer's color selector for custom mixed colors for Architect's color scheduling.
      b. Opaque coatings: Two 9 x 12 inch finished samples on hardboard of each color scheduled in each finish for review and approval. Identify boards with finish type, color mix number and scheduled substrate surfaces or materials.

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c. Transparent finishes and stains: Two 9 x 12 inch finished samples on same species of solid wood and plywood to be furnished under Section 062000 - FINISH CARPENTRY, of each color scheduled in each finish for review and approval. Identify boards with finish type, color mix number and scheduled substrate surfaces or materials.

B. Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS:

1. Color chips: After final approval of all colors and tints by the Architect, submit to the Owner, color chips of all coatings used, with manufacturer's name and mix designation of the coating for the purpose of future re-ordering of coatings. Color chips shall be at least six (6) square inches in size, for each color and tint.

1.5 QUALITY ASSURANCE

A. Applicator: Company specializing in commercial painting and finishing with 3 years minimum documented experience.

B. Single source responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

C. Environmental Requirements for Volatile Chemicals:

1. For interior applications use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24) and the following chemical restrictions:
   a. Flat Paints and Coatings: VOC not more than 50 g/L.
   b. Non-Flat Paints and Coatings: VOC not more than 150 g/L.
   c. Anti-Corrosive Coatings: VOC not more than 250 g/L.
   d. Clear wood finishes:
      1) Varnishes: VOC not more than 350 g/L.
      2) Lacquer: VOC not more than 550 g/L
   e. Floor coatings: VOC not more than 100 g/L
   f. Sealers:
      1) Waterproofing sealers: VOC not more than 250 g/L.
      2) Sanding sealers: VOC not more than 275 g/L.
      3) All other sealers: VOC not more than 200 g/L.
   g. Stains: VOC not more than 250 g/L.
2. Do not use water based paints formulated with aromatic hydrocarbons (organic solvent with a benzene ring in its molecular structure), formaldehyde, halogenated solvents, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides. Water based paints shall be low VOC and shall have a flash point of 61 degrees C or greater.
3. Where it is necessary to use solvent-based paints, with less than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
4. The following shall be low VOC and not be formulated with aromatic hydrocarbons (organic solvent with a benzene ring in its molecular structure).
   a. High performance water based acrylic coatings.
   b. Pigmented acrylic sealers.
   c. Catalyzed epoxy coatings.
   d. High performance silicone grafted epoxy coatings.
5. Restricted Components: Paints and coatings used on this Project shall not contain any of the following compounds. (Excluded from this restriction are residual quantities of naturally occurring elements and chlorinated organics which are found in chlorinated water supplies; contaminate levels shall be below that of the National Primary Drinking Water Standard):

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a. 1,2-dichlorobenzene
b. Alkylphenol ethoxylates (APEs)
c. Formaldehyde-donors
d. Heavy metals, including lead, mercury, cadmium, hexavalent chromium and antimony in the elemental form or compounds
e. Phthalates
f. Triphenyl tins (TPT) and tributyl tins (TBT).

1.6 FIELD SAMPLES

A. Provide field samples under provisions of Section 014500 - QUALITY CONTROL for purpose of verifying selected colors.

B. Paint on-site sample areas, minimum 40 square feet, illustrating selected color, and tint.

C. Locate samples where directed. The Contractor shall provide in the base Contract, a total amount of samples equal to one sample per room.

D. Accepted samples may remain as part of the work.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers; container labeling shall include manufacturer's name, type of paint, color mix designation, expected coverage, surface preparation instructions, instructions for mixing and reducing, drying time, and clean-up recommendations.

B. Store materials, conforming with applicable codes and fire regulations, in designated spaces. Keep storage area secure when direct access is not required or when not performing work under this Section. Take precautionary measures to prevent fire hazards and spontaneous combustion, maintain a dry-chemical type fire extinguisher in all areas where materials of this Section are being stored or used.

C. Store paint materials in a well ventilated area at minimum ambient temperature of 45 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit.

D. Do not use the sanitary system for mixing or disposal of refuse material. Carry water to mixing rooms and dump waste material in a suitable refuse receptacle. Remove oily rags and waste each day.

1.8 PROJECT CONDITIONS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees Fahrenheit for 24 hours before, during and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Apply paints and finishes above minimum temperature conditions in strict accordance with manufacturer's instructions.

C. Provide sufficient lighting to maintain 80 foot-candles measured mid-height at substrate surface.

1.9 SEQUENCING AND SCHEDULING

A. The applicator of work specified herein is responsible to ensure that all paints, enamels, and coatings, proposed to be applied hereunder, are compatible with coatings used for shop-primed items and items which have been prime-coated under the work of other trades.

B. Immediately notify the Architect in writing of conditions which may require a change in the specifications of this Section before proceeding with the work. Failure to do so, in a timely fashion, so as not to interfere with the schedule of work of this Contract, shall be construed

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as acceptance of the coatings specified. Perform all corrective measures, at no cost to the Owner, for any defects in the work, resulting from the use of such materials.

C. Painting work should be scheduled so as to minimize touch-ups. Interior painting is to be without flash marks. Should flash marks occur due to touch-ups, the Contractor shall be required to redo the entire surrounding wall surface.

D. Do not order materials until all required schedules have been properly submitted, reviewed by the Contractor and Approved by Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:

1. Paints and general finishes:
   a. Basis of Design: Sherwin Williams, Cleveland, OH.
   b. Benjamin Moore & Company, Montvale, NJ.
   c. Pittsburgh Paints / PPG Industries, Inc., Pittsburgh, PA.
2. Interior stains and clear finishes for wood
   a. Basis of Design: Sherwin Williams, Cleveland, OH.
   b. Benjamin Moore & Company, Montvale, NJ.
   c. Samuel Cabot, Inc., Newburyport, MA.
   d. PPG Architectural Finishes Inc., Olympic Home Care Products Division, Pittsburgh, PA.

2.2 MATERIALS

A. Coatings: Ready mixed, except for field catalyzed coatings with good flow and brushing properties; capable of drying or curing free of streaks or sags. Color pigments shall be processed to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating. Provide best quality grade, where manufacturer makes more than one grade of any material specified.

2.3 ACCESSORIES

A. Accessory materials: other materials not specifically indicated, but are required to achieve the finishes specified of commercial quality.

B. Cleaning Materials: Tri-Sodium Phosphate (TSP) substitute. Acceptable products include the following, or approved equal:

1. Savogran, Norwood MA, products “TSP-PF”, or “Liquid TSP Substitute”.
2. Custom Building Products, Seal Beach, CA., product “Custom T.S.P. Substitute”.
3. DAP Inc., Baltimore MD., product “T.S.P. Substitute Heavy Duty Cleaner”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Notify Contractor of any condition that may potentially affect proper application of coatings.

B. Measure moisture content of surfaces, do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Gypsum board and joint treatment: 12 percent.

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2. Interior wood: 15 percent.

C. Beginning Work of this Section means acceptance of substrate surfaces and site conditions.

3.2 PREPARATION

A. Furnish and lay suitable drop cloths in all areas where coating work is being done to protect floors and all other surfaces from damage during the work. Protect adjoining surfaces with painters mask tape.

B. Prior to preparing surfaces or finishing, remove all finish hardware for painting doors and frames, remove electrical plates, light fixture trim and fittings. Re-install hardware and other removed items after painted surfaces are thoroughly dry.

C. Mix coatings thoroughly, unless otherwise directed by the manufacturer of the specific coating used, to ensure uniformity of color and mass. Strain previously opened coatings to remove skins, lumps, and other foreign matter prior to painting.

D. Thin or reduce materials only as recommended by the specific material manufacturer, and only with the approval of the Architect.

E. Impervious surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to thoroughly dry.

F. Previously painted surfaces to receive wall covering:

1. Sand with 320 grit waterproof paper until surfaces are uniformly abraded.

G. New interior wood items scheduled to receive paint finish.

1. Smooth minor defects and remove all foreign matter by sanding, and if necessary, steel wool.
2. Wash sap spots and knots with mineral spirits. When dry, touch up knots, pitch streaks, and sappy sections with commercial stain sealer.
3. Fill up nail holes and cracks with wood putty or plastic wood after primer of first coat of finish is dry, and sand smooth.

H. Gypsum board surfaces: Fill minor defects with latex based spackle. Spot-seal all compound surfaces and repair areas in gypsum board, with specified first coat material before application of the first coat.

3.3 APPLICATION

A. Apply all materials in strict accordance with the approved manufacturer's printed instruction, and in accordance with the best trade practices. Each coat shall be reviewed and approved by the Architect before succeeding coats are applied.

B. Do not apply successive coating until the preceding coat is thoroughly dry, and in no case in less than 24 hours after the preceding coat.

C. Number of coats is indicated under Painting Schedules. Number of coats is indicated as a minimum number to be applied over scheduled substrates. An additional coat or coats may be required for proper color coverage of substrate as determined by the Architect, at no additional cost to the Owner. Examples of these conditions include, but are not limited to:

1. Dark colored substrates may require an additional primer or intermediate coat to stabilize color, if final applied top-coat color is light.
2. Pre-finished or pre-primed products may require an additional field applied coat to stabilize the shop/factory applied base color prior to application of top-coat finishes.
3. Dark color top coat finishes may require additional finish coat over white or light colored substrates to obtain correct color density.

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D. Apply each coat to a uniform finish; Apply primer and first coat of slightly lighter in color ti... than the scheduled color of the final coat.

E. Sand lightly between coats to achieve required finish and remove sanding dust prior to applying succeeding coat.

F. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

G. Prime back surfaces of all interior woodwork scheduled for painted finish with primer.

H. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

3.4 CLEANING

A. Upon completion of the work in each area, remove all coating splatters from glass, prefinished surfaces, bright metals, and from other surfaces that have not been painted or finished hereunder. Do not use abrasive paper or abrasive cleaner on any prefinished surface or bright metal. Remove all materials and debris; leave work area in a clean condition.

3.5 PROTECTION AND TOUCH-UP

A. During painting work, protect the work of other trades against undue soilage and damage by the exercise of reasonable care and precautions. Properly clean, repair or replace any work so damaged and soiled.

B. Protect all painted and finished surfaces against damage until the date of final acceptance of the work. The Architect will conduct a final review of all work performed hereunder. Re-coat or touch-up, all scratches and other blemishes on surfaces, and as directed by the Architect, any areas found which do not comply with the requirements of this Section, and bear all costs therefore.

C. Any re-coating or touch-up work, required after the work of this Section has been reviewed and accepted by the Architect, will be paid for by the Contractor.

3.6 PAINTING SCHEDULE

A. Colors: The Architect will furnish a schedule of colors for each area and surface. Tinting and matching shall be to the satisfaction of the Architect. No limit is placed on the number of colors that may be required, or the number of colors in any one room, area, or surface. Premium paints of deep-hued, bright, pigment intensive, accent and primary colors may be scheduled for up to 25 percent of all interior surfaces without additional cost to the Owner.

1. Colors of priming coats (and body coats where specified) shall be lighter in tint than those of finish coat.
2. Colorants: Pure, non-fading pigments, mildew-proof, ultra-violet resistant, finely ground in approved medium; and be limeproof, when used in coatings to be applied on masonry, concrete, plaster, and gypsum board surfaces.

B. Paint schedule for interior surfaces and materials: Refer to Document 099123 - INTERIOR PAINTING SCHEDULE.

C. Paint schedule for labeling and identifying fire resistive and rated designations: Refer to Document 099123 - INTERIOR PAINTING SCHEDULE.

D. Painting schedule for mechanical and electrical equipment: Refer to Document 099123 - INTERIOR PAINTING SCHEDULE.

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SECTION 099123

INTERIOR PAINTING SCHEDULE

1.1 GENERAL PROVISIONS

A. General: Number of coats scheduled herein below is minimum required, refer to Article entitled “APPLICATION” in specification Section 099100 - PAINTING, regarding coverage.

1.2 PAINTING SCHEDULE FOR INTERIOR SURFACES AND MATERIALS

A. Interior underside of metal decking, exposed to view joists, overhead steel, sprinkler piping, conduits, ducts and similar items:

1. Two coats waterborne acrylic dry fall finish:
   a. Sherwin-Williams: “Waterborne Arcylic Dry Fall”, B42 Series.
   b. Moore: “Sweep-Up Spray Latex Flat, Nº. 153.
   c. Pittsburgh: “Speedhide Latex Dry Fog Spray Paint”, 6-714/715 Series.

B. Interior gypsum board (drywall) partitions and walls, previously painted:

1. Two coats eggshell paint:
   a. Sherwin-Williams: "Harmony Low Odor Interior Latex Eg-Shel”, B9 Series”.
   b. Moore: “Eco Spec Interior Latex Eggshell”, Nº. 223.
   c. Pittsburgh: “Pure Performance Eggshell”, Nº. 9-300.

C. Interior gypsum board (drywall) partitions:

1. One coat latex primer.
   a. Sherwin-Williams: "Harmony Interior Latex Primer”, B11W900 Series.
   b. Moore: “Eco Spec Interior Latex Primer Sealer”, Nº. 231.
   c. Pittsburgh: “Pure Performance Interior Latex Primer”, Nº. 9-900.
2. Two coats eggshell paint:
   a. Sherwin-Williams: "Harmony Low Odor Interior Latex Eg-Shel”, B9 Series”.
   b. Moore: “Eco Spec Interior Latex Eggshell”, Nº. 223.
   c. Pittsburgh: “Pure Performance Eggshell”, Nº. 9-300.

D. Interior gypsum board (drywall) partitions, and ceilings, at Large Exam Room, Lab, Clean and Solied Rooms, and Housekeeping Room, for VOC compliant epoxy finish:

1. One coat of sealer,
   a. Sherwin-Williams: "ProMar 200 Zero VOC Interior Latex Primer", B28w2600 Series.
   b. Moore: “SuperSpec Primer”, Nº. 253.
   c. Pittsburgh: “Speedhide Interior Quick Drying Latex Sealer”, 6-2 Series.
   d. Tnemec: PVA 51-792 Sealer.
2. Two coats of semi-gloss Water Based Acrylic-Epoxy Coatings (3 mils DFT each coat).
   a. Sherwin-Williams: "Water Based Catalyzed Epoxy" B70/B60V15 Series.

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b. Moore: “Industrial Acrylic Epoxy Enamel”, Nºs. P43/P44.

c. Pittsburgh: “Pitt-Glaze Water Based Acrylic Epoxy Enamels”, 16 Series.

E. Interior gypsum board (drywall) ceilings and underside of soffits, previously painted:

1. Two coats flat paint:

a. Sherwin-Williams: “Harmony Low Odor Interior Latex Flat”, B5 Series.

b. Moore: “Eco Spec Interior Latex, Flat”, Nº. 219.

c. Pittsburgh: “Pure Performance, Flat”, 9-100 Series.

F. Interior gypsum board (drywall) ceilings and underside of soffits:

1. One coat latex primer.

a. Sherwin-Williams: "Harmony Interior Latex Primer”, B11W900 Series.

b. Moore: “Eco Spec Interior Latex Primer Sealer”, Nº. 231.

c. Pittsburgh: “Pure Performance Interior Latex Primer”, Nº. 9-900.

d. Sherwin-Williams: "Harmony Interior Latex Primer”, B11W900 Series.

2. Two coats flat paint:

a. Sherwin-Williams: “Harmony Low Odor Interior Latex Flat”, B5 Series.

b. Moore: “Eco Spec Interior Latex, Flat”, Nº. 219.

c. Pittsburgh: “Pure Performance, Flat”, 9-100 Series.

G. Interior metal, ferrous, excluding railings, to receive semi-gloss finish: (includes existing metal doors and frames):

1. One coat of rust prohibitive primer for unfinished metal surfaces, and touch up bare metal at shop primed, existing and previously coated surfaces:

a. Sherwin-Williams: "DTM Acrylic Primer Finish", B66 W1 Series.

b. Moore: “Acrylic Metal Primer”, Nº. P04.

c. Pittsburgh: “Pitt-Tech DTM Primer/Finish 100% Acrylic”, 90-709/712 Series

2. Two coats acrylic semi-gloss enamel:

a. Sherwin-Williams: “Sher-Cryl HPA Semi-Gloss”, B66 Series.

b. Moore: “Super Spec HP DTM Semi-Gloss Enamel”, Nº. P29.

c. Pittsburgh: “Pitt-Tech Plus High Performance, Semi -Gloss DTM Industrial Enamel”, 90-1210 Series.

H. Interior metal, railings, (handrails and guardrails) to receive aliphatic acrylic polyurethane finish:

1. First coat, epoxy undercoat:

a. Sherwin-Williams: “Recoatable Epoxy Primer” @4.0-6.0 mils DFT.

b. Moore: “Superspec HP Epoxy Metal Primer”, P33 Series.

c. International: “Interseal 670 HS” at 5.0 mils DFT.

d. Tnemec: “69 Color High-Build Epoxoline II” at 3.0 mils DFT.

e. Devoe Coatings: Tru-Glaze-WB” 4030 Waterborne Epoxy Primer

f. Pittsburgh: “PPG All Weather DTR” 97 Series @ 5 mils DFT, 18 Month Recoat

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2. Second coat, high gloss aliphatic acrylic polyurethane coating:
   a. Sherwin-Williams: “Acrolon 218 HS Acrylic Polyurethane” @ 3.0-6.0 mils DFT.
   b. Moore: “Superspec HP Aliphatic Urethane”, P74 Series.
   c. International: “Interthane 990” at 4.0 mils DFT.
   d. Tnemec: “74 Endura Shield” at 4.0 mils DFT.
   e. Pittsburgh: “Pitt-Thane Ultra” 95-800 Series @ 4 mils DFT.

I. Interior wood trim and other miscellaneous items, new, unfinished, to receive painted (opaque) finish:
   1. One coat acrylic primer-sealer (undercoater):
      a. Sherwin-Williams: "PrepRite Classic Latex Primer”, B28W200 Series.
      b. Moore: “Alkyd Enamel Underbody”, Nº. 217.
      c. Pittsburgh: “Speedhide Alkyd Interior Quick-Drying Enamel Undercoater”, 6-6 Series.
   2. Two coats acrylic semi-gloss enamel:
      a. Sherwin-Williams: “ProClassic Waterborne”, B31W20 Series.
      b. Moore: “Superspec Latex Semi Gloss”, 276 Series.
      c. Pittsburgh: “Speedhide Interior Semi-Gloss”, 6-500 Series.

J. Interior gypsum board (drywall) partitions to receive Dry Erase Coating:
   1. Two coats water-based primer/sealer:
      a. Masterchem Industries, Imperial MO, product “Kilz Premium”. No substitutions will be considered.
   2. Two coats Dry Erase Coating: Tabrasatm by IdeaPaint, 2-part, water-borne paint coating. No substitutions will be considered.
      a. Application of Dry Erase Coating shall be by roller application using Purdy White Dove 1/4 inch nap “For Very Smooth Surfaces” roller cover, 9 inches wide. No substitutions.

1.3 PAINTING SCHEDULE FOR FIRE RESISTIVE AND RATED DESIGNATIONS

A. In compliance with Section 703.6 of the 2009 International Building Code, and as additionally specified herein, provide identification for all fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions and any other wall or partition which is required to have protected openings or penetrations.
   1. Application:
      a. Apply to outside of fire rated shafts, and to both sides of partitions at intervals not to exceed 30’-0” for entire length of partition or wall, or once on any partition 30’-0 feet or less in length.
      b. Locate identification in all accessible concealed floor, floor-ceiling and attic spaces. Locate identification within 12 to 18 inches above finished ceilings.
      c. Apply stenciled lettering by spray or brush, or provide permanent signage. Identification shall be waterproof, fade-proof and non-combustible. Signage shall be mechanically fastened or permanently adhered to partition.

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d. Stencil character height: 1 inch minimum.

e. Color: Easily identifiable color, contrasting with background, acceptable to Owner.

2. Apply stenciled lettering to the following types of partitions using wording specified:

a. Applied identification for 2 hour fire rated partitions shall read: “2 HOUR FIRE WALL - PROTECT ALL OPENINGS”.

b. Applied identification for 1 hour fire rated partitions shall read: “1 HOUR FIRE WALL - PROTECT ALL OPENINGS”.

c. Applied identification for Smoke barriers shall read: “1 HOUR SMOKE BARRIER - PROTECT ALL OPENINGS”.

d. Applied identification for Smoke partitions shall read: “SMOKE BARRIER PARTITION - PROTECT ALL OPENINGS”.

1.4 PAINTING SCHEDULE FOR MECHANICAL AND ELECTRICAL EQUIPMENT

A. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black enamel.

B. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

C. Remove unfinished louvers, grilles, covers and access panels on and paint as scheduled above.

D. Plywood backboards for electrical panels and other equipment. Paint both front and back surfaces and all edges of plywood backboards before backboards are installed.

1. One coat latex primer-sealer (undercoater):

a. Sherwin-Williams: "Harmony Interior Latex Primer” B11W900.

b. Moore: “EcoSpec Interior Latex Primer Sealer” 231.

c. Pittsburgh: “Pure Performance Interior Latex Primer”.

2. Two coats fire retardant paint:

a. Firefree Coatings, Inc., San Rafael CA., product “Firefree22”.

b. Flamstop, Inc., Fort Worth TX., product “Flamestop III paint additive” (mixed with latex paint, refer to wood trim paints specified herein).

c. Rosco Inc., Sun River CA. Product “Flamex paint additive” (mixed with latex paint, refer to wood trim paints specified herein).

d. Fire Retardants Inc., Chaska MN., Product “Burn Barrier 20-20”

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SECTION 102813

TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install toilet, healthcare, and custodial accessories.

B. Furnish and install protection padding for exposed piping.

C. Furnish concealed anchorage devices for handicap handrails for installation under Section 061000 - ROUGH CARPENTRY.

D. Furnish toilet accessory templates, to locate anchorage reinforcement, to trades responsible.

E. Owner-Furnished Material: Owner will furnish the following accessories for installation by the Contractor (OFCI):

1. Soap/lotion dispensers and hand sanitizers, paper towel dispensers, toilet tissue holders, sharps disposals, and glove boxes.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 061000 - ROUGH CARPENTRY:

1. Wood blocking.
2. Installation of concealed anchorage devices for grab bars in toilet rooms, this Section 102813 - TOILET ACCESSORIES.

E. Section 092900 - GYPSUM BOARD: Gypsum board partitions and metal framing.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 014200 - REFERENCES.

B. ANSI A 117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.

1.4 SUBMITTALS

A. Submit the following under provisions of Section 013000 - ADMINISTRATIVE REQUIREMENTS:

1. Literature: Manufacturer's product data sheets, for each item furnished hereunder.
2. Schedule: Complete schedule, indicating types, quantity, and model numbers of accessories for each location in which the accessories will be installed.
3. Selection samples: Sample color chips indicating each manufacturer's full range of colors available for selection by Architect.
4. Verification samples: Complete units, as requested by Architect.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable codes and accessibility regulations, and comply with ANSI A 117.1 for installation of work.

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1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers or bundles bearing brand name, identification of manufacturer or supplier and item identification number corresponding with approved schedule.

B. Store materials inside, under cover, and in manner to keep them dry, protected from weather, surface contamination, corrosion and damage from construction traffic and other causes.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

B. Coordinate the work of this Section with placement of internal wall reinforcement.

1.8 WARRANTY

A. Deliver to the Owner upon completion of the work of this Section, applicable manufacturer's standard warranties.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: The design for accessories is based on specific products indicated. Provide the named product as manufactured by the following:

1. Bradley Corporation/Washroom Accessories Division, (Bradley) Menomonee Falls, WI.
2. Bobrick Washroom Equipment, Inc. (Bobrick), Clifton Park, NY.
3. Kohler Co., (Kohler) Kohler, WI.
4. Smedbo Inc., (Smedbo) Lake Bluff, IL.

2.2 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

1. Grind welded joints smooth.
2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Stainless Steel Sheet: ASTM A666, Type 304.

C. Stainless Steel Tubing: ASTM A269, Type 304 or 316.

D. Mirror Glass: Float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

E. Adhesive: Two component epoxy type, waterproof.

F. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

G. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FINISHES

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.

C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

D. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

E. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

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F. Back paint components where contact is made with building finishes to prevent electrolysis.

2.4 TOILET ACCESSORIES

A. Grab Bars: Stainless steel, 1-1/4 inches (32mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches (38 mm) clearance between wall and inside of grab bar.

1. Basis of Design: B5806.99 series manufactured by Bobrick, in lengths as indicated on the Drawings.

B. Mirrors: No. 1 quality, 1/4-inch glass mirror with 3/4-inch by 3/4-inch stainless steel angle frame, vertical grain satin finish; 24-inch by 36-inch, unless otherwise indicated.

1. Basis of Design: Model 780, manufactured by Bradley.

C. Stainless Steel Shelf: Stainless steel, 8 inches deep by 24 inches wide with 3/4 inch edge return. Mounting brackets, 16 gauge welded to shelf.

1. Basis of Design: Model 758, manufactured by Bradley.

D. Hooks: Heavy-duty solid brass, double prong, oblong bracket and backplate for concealed attachment, brushed chrome finish.

1. Basis of Design: Model HS356 manufactured by Smedbo Inc.

2.5 ADA PIPING PROTECTION

A. Specified Product (Basis of Design): IPS Corporation, Collierville, TN., product “Soft Guard Plus”.

1. Description: 1/8 inch thick pliable PVC Shell finish Soft Guard Plus on all drainage piping including hot and cold water valve and supplies under lavatories to comply with ADA and UPC standards. Covers shall be secured by custom fit, tamper-resistant snap-to-lock fasteners.
2. Complies with ICC/ANSI A117.1 (sec 606.6).
3. PVC Base Insulation Material, Class A rated complying with 25 Flame Spread/450 Smoke Index (tested under ASTM E-84).

2.6 LOCKS

A. General: All locks shall be keyed alike. Provide four (4) keys, for lockable accessories, to the Owner.

2.7 INSTALLATION ACCESSORIES

A. Fasteners, screws, and bolts: Type 304 stainless, tamperproof.

B. Expansion shields: Fiber, lead or rubber as recommended by accessory manufacturer for component and substrate.

2.8 FABRICATION

A. Welding, AWS D10.4.

B. Provide steel anchors and components required for secure installation.

C. Form exposed surfaces from single sheet of stock, free of joints. Form surfaces flat without distortion, scratches or dents. Weld and grind smooth joints of fabricated components.

D. Back paint components where contact is made with building finishes to prevent electrolysis.

E. Shop assemble components and package complete with anchors and fittings. Hot dip galvanize exposed and painted ferrous metal and fastening devices. Provide steel anchor plates, adapters, and anchor components for installation.

F. Hot-dip galvanized steel, except stainless steel, anchors and fastening devices.

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G. Shop assemble accessories and package with all components, anchors, fittings, fasteners and keys.

H. Key items alike.

I. Provide templates and rough-in measurements as required.

J. Round and deburr edges of sheets to remove sharp edges.

K. Provide steel anchors and components required for secure installation.

2.9 FACTORY FINISHING

A. In accordance with NAAMM AMP 500 series.

B. Ferrous metals: Clean and treat, spray apply one coat of baked-on rust and moisture-resistant primer, followed by two coats of baked-on synthetic enamel, in selected colors. Ensure that finish coating is uniform in color intensity and degree of gloss, throughout.

C. Chrome/Nickel Plating: ASTM 456, Type SC2, satin finish.

D. Stainless steel: NAAMM AMP 503, Number 4 satin finish, except as otherwise specified above under the Article entitled “Toilet Accessories”.

E. Nylon Coated Steel: Nylon coating powder formulated for a fluidized bonding process to steel to provide a hard smooth, medium gloss finish, not less than 0.3 mm (0.012-inch) thick, rated as self-extinguishing when tested in accordance with ASTM D635.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Ensure of the following:

3.2 PREPARATION

A. Provide templates and rough-in measurements as required. Deliver inserts and rough-in frames to site at appropriate times for building-in by other trades

B. Coordinate with trades responsible for providing receiving surfaces on which accessories will be installed.

C. Exact locations of accessories within each room or area shall be as directed by the Architect.

3.3 INSTALLATION

A. Perform installation work in accordance with the approved shop drawings and the manufacturer's installation instructions.

B. Install toilet accessories absolutely level and in true line, securely and rigidly anchored with theft proof fasteners of the size and type most appropriate for the specific receiving surface, concealing the fasteners as far as practicable.

3.4 ADJUSTING

A. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

3.5 CLEANING

A. Remove all protective films and coverings from accessories, and clean and polish each piece. Remove all rubbish, packing materials, and debris, caused by the work of this Section.

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SECTION 104400

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 061000 - ROUGH CARPENTRY: Wood blocking product and execution requirements.

E. Section 092900 - GYPSUM BOARD: Framing of openings for fire extinguisher cabinets.

1.3 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers, 2013 Edition.

1.4 SUBMITTALS

A. See Section 013000 - ADMINISTRATIVE REQUIREMENTS, for submittal procedures.

B. Shop Drawings: Indicate cabinet physical dimensions.

C. Product Data: Provide extinguisher operational features.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

B. Conform to NFPA 10.

C. Provide extinguishers and cabinets classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver materials to project site in manufacturer's original, unopened undamaged containers, with identification labels intact.

B. Store materials in original packaging, protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by the manufacturer.

1.7 FIELD CONDITIONS

A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

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B. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS - MANUFACTURERS

A. Fire Extinguisher Cabinets and Accessories:
1. JL Industries, Inc: www.activarcpg.com.
2. Larsen's Manufacturing Co: www.larsensmfg.com.
3. Tyco Fire Protection Products; Ansul: www.ansul.com.

2.2 FIRE EXTINGUISHER CABINETS

A. Semi-recessed fire extinguisher cabinets:
1. Cabinet trim style: Square trim, semi-recessed cabinet.
   a. Protruding from wall: nominally 1-1/4 to 1-1/2 inches.
2. Door: Cold-rolled steel with factory applied white thermally fused polyester coating, acceptable to receive a field applied recoating.
   a. Style: Vertical duo design with clear tempered safety glass.
   b. Door Handle: Door handle matching material and finish of door.
   c. Lettering: Factory applied die-cut lettering, applied to metal portion of door.
      1) Pattern: Vertical reading.
      2) Color: Black
3. Acceptable models for non-fire-resistant rated assemblies:
   a. JL Industries “Ambassador Series”, model number 1816.
   b. Larsen “Architectural Series”, model number 2409-5R.
   c. Potter-Roemer, “Alta Series”, model number 7012.
4. Acceptable models for fire-resistant rated assemblies:
   a. JL Industries “Ambassador Series”, model number 1816-FX.
   b. Larsen “Architectural Series”, model number FS-2409-5R.
   c. Potter-Roemer, “Alta Series”, model number FRC-7012.

B. Surface-mounted fire extinguisher cabinets:
1. Trim style, material and accessories shall be the same as the semi-recessed cabinets indicated above.
2. Acceptable models for surface mounted cabinets:
   a. JL Industries “Ambassador Series”, model number 1013.
   b. Larsen “Architectural Series”, model number 2409-SM.
   c. Potter-Roemer, “Alta Series”, model number 7026.

2.3 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

B. Dry Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gage.
1. Class: ABC.
2. Size: 10 lb.
3. Finish: Baked enamel, red color.
4. Basis of Design: Larsen's Manufacturing Co; MP Series.

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2.4 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

1. Provide bracket for all fire extinguishers not located in cabinets.
2. Basis of Design: Larsen's Manufacturing Co.; Model 862.

B. Cabinet Signage: 14" x 12" 90º angle projecting wall mounted sign with vertical arrows and lettering.

1. Basis of Design: JL Industries, Inc; Model PWM108.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, at height indicated from finished floor.

C. Secure rigidly in place.

D. Place extinguishers in cabinets.

E. Install brackets at locations where fire extinguishers are not indicated to be in cabinets.

1. Secure rigidly in place.
2. Mount extinguishers on brackets.

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SECTION 124843
FLOOR MATS

PART 1 – GENERAL

1.1 SUMMARY

A. Furnish and install the following:

1. Fibered modular tile entrance systems where indicated on the Drawings, including all accessories necessary to complete the work.

1.2 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

B. Section 016000 - PRODUCT REQUIREMENTS: Listing of VOC requirements for adhesives, cleaning/maintenance materials, paints, coatings, and sealants.

C. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL: Procedural and administrative requirements for construction and demolition recycling.

D. Section 033000 - CAST-IN-PLACE CONCRETE: Refinished concrete substrate.

E. Section 096513 - RESILIENT BASE AND ACCESORIES: Straight resilient base, where indicated in conjunction with floor mats.

1.3 REFERENCES

A. Reference Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM D 2859 - Test Method for Flammability of Finished Textile Floor Covering Materials.
2. ASTM E 84 - Surface Burning Characteristics of Building Materials.
3. ASTM E 648 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
4. NFPA: Publication 253 - Test for Critical Radiant Flux of Floor Covering Systems.
5. All applicable federal, state and municipal codes, laws and regulations regarding flammability and smoke generation of interior finishes.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Sequencing / field measurements:

1. Take field measurements before preparation of shop drawings and fabrication, where possible, to ensure proper fitting of Work.
2. Measure all areas to receive materials to be furnished and installed hereunder, and verify in the field their actual dimensions, including wall-to-wall dimensions, offsets, door locations, and details, fixed equipment, and all other installed items.
3. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay Work. Extra charges will not be allowed because of lack of familiarity with actual project conditions. Use largest floor mat widths to produce minimum number of seams. Small pieces of floor mat will not be acceptable.
4. Sequence work to ensure floor mat is not installed until sufficient heat is provided, dust generating activities have terminated and work overhead is completed.
5. Install floor mat after interior wet work is complete and fully cured.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 013000:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, physical properties, for each item furnished hereunder, including floor, accessories,

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adhesives, and leveling materials. Include manufacturer's application methods or installation instructions for each item furnished hereunder.

2. Shop Drawings.
3. Selection Samples:
   a. Sample mat swatches containing manufacturer's full color and blend range.
4. Verification Samples: After initial selection of floor mat and color blends has been made by the Architect: 18-inch by 36-inch sample of selected floor mat for final approval of the Architect. Approved samples shall be used as the standard of quality and colors for materials furnished under this Contract.
5. Certificates: Provide certificate stating that the floor mat, and other related materials to be supplied hereunder meet all requirements specified herein.

B. Closeout Submittals: Submit the following under provisions of Section 01 78 00 - CLOSEOUT SUBMITTALS.
   1. Bonds and Warranty Documentation:
      a. Manufacturer’s Warranties and Guarantees as specified elsewhere herein this Section. Describe coverage of materials and installation and resultant damage from failure of installation

C. Maintenance Material Submittals: Submit the following under provisions of Section 017800 - CLOSEOUT SUBMITTALS. Clearly label and package extra materials securely to prevent damage.
   1. Extra Stock Materials: Upon completion of the Work of this Section, deliver to the Owner extra materials for future repairs and maintenance, an amount equal to 25 square feet of floor mat for each color, finish and type installed.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Do not deliver items to the site, until all specified submittals have been submitted to, and approved by, the Architect.
   2. Do not deliver floor mat materials to the project until all concrete, masonry, plaster and other wet work has been completed and dry.
   3. Deliver materials in original packages, containers or bundles bearing brand name, and identification of manufacturer or supplier.

B. Storage and Handling Requirements:
   1. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.
   2. Store materials for 3 days prior to installation in area of installation to achieve temperature and humidity stability.
   3. Protect materials from damage due to moisture, direct sunlight, excessive temperatures, surface contamination, corrosion and damage from construction operations and other causes.
      a. Store all mat materials under cover in dry, well-ventilated spaces as soon as delivered.
      b. Protect floor mating from damage, dirt, stain, moisture, and mildew.

1.8 SITE CONDITIONS

A. Maintain a temperature of at least 60 degrees Fahrenheit, with a relative humidity of between 15 and 60 percent, for a period of 72 hours before, during, and 24 hours after installation.

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1.9 WARRANTY

A. General: Submit warranties under provisions of Section 017800 - CLOSEOUT SUBMITTALS.

B. Manufacturer Warranty: Manufacturer's 10 year warranty which shall include texture retention, wear, and static protection and edge ravel resistance and run resistance strength for the life of the matting. Commencing on the date of substantial completion.

C. Special Warranty: Mat installer's written guarantee covering prompt and proper replacement of any and all floor mating which indicates improper installation workmanship and/or defective material within twelve months from completion of the installation and acceptance thereof by the Architect, said corrective work being performed by the mat installer at no cost to the Owner.

PART 2 - PRODUCTS

2.1 FLOOR MATS

A. Walk-off Mat (WOM-1): To establish a standard of quality, design and performance desired, specifications have been based on Johnsonite Tarkett, product "Resilient Terra-Turf Rubber Floor Tile" conforming to the following:

1. Size: 12 by 12 inches (30.48 cm by 30.48 cm)
2. Thickness: 3/8 inch (9.53 mm).
3. Color: Black/brown.
4. Hardness (ASTM D 2240): Not less than 85 Shore A.
5. Abrasion Resistance (ASTM D 3389): <1.0 gm weight loss.
6. Slip Resistance (ASTM D 2047): Exceeds static coefficient of friction of 0.5.
7. Fire Resistance (ASTM D2859): Passes.

2.2 FABRICATION

A. General: Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Architect.

B. Shop-fabricate units of floor mat to greatest extent possible in sizes as indicated. Where not indicated otherwise, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints. Where possible, verify sizes by field measurement before shop fabrication.

2.3 ACCESSORIES

A. Adhesives for matting: NFPA Class A or UBC Class 1 types, as determined by ASTM E-84 Tunnel Test and as recommended by mat manufacturer.

1. Advanced Adhesive Technology, Inc, Dalton GA.
2. DAP Incorporated, Dayton OH.
3. W.W. Henry Company, Huntington Park CA.
4. Macklanburg-Duncan Company, Oklahoma City, OK.

B. Filler for patching, smoothing and leveling substrate: Portland cement-based latex underlayment acceptable to flooring manufacturer, equal to the following:

1. Ardex, Inc., products "Feather Flash" and "Ardex SD-P".
2. Quikrete Companies, product "Fast-Set Underlayment 1248".
3. Silpro Masonry Systems Inc., product "Profinish".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.

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1. Request correction of defects in receiving surfaces which are not correctable by the methods specified herein. Do not commence work until such defects are entirely corrected.
2. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

A. Protection of In-situ Conditions: During the operation of work of this Section, protect surrounding materials and finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing surfaces which are soiled or otherwise damaged by Work of this Section, to match indicated profiles and specified finishes. Materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work in conformance with the Contract Documents.

B. Surface Preparation:

1. Apply, trowel, and float filler to leave smooth, flat and hard surface, as required to ensure that floor mated surfaces will be level to within 1/8 inch tolerance in 10 feet in any direction.
2. Prohibit traffic until filler is cured.
3. Thoroughly sweep and vacuum all surfaces and remove all foreign matter.

C. Unroll floor mat for adjustment to environmental conditions at least 24 hours prior to installation.

3.3 INSTALLATION

A. Install entry mat in accordance with manufacturer's written instructions.

B. Roll all floor mat areas with a 30 pound floor mat roller to ensure proper contact of floor mat with adhesive, and to remove all bubbles and buckles. Carefully roll seams and edges with the roller centered over the seam.

C. Run all floor mat in the same direction. Plan and install floor mat in all areas so that single pieces per area shall be used to the fullest extent possible. No seams will be permitted in areas which are 12 feet, or less, in width.

D. Carefully measure all cut-outs at the project.

E. Make all seams in floor mating by back-cutting the floor mat [or mat] on an angle so that the face yarn of abutting pieces intermingles, and provides a practically invisible transition at each seam location. Center seams, occurring at door openings, parallel to, and directly under, the doors. Seams occurring at corridor change of direction shall follow wall line parallel to floor mat direction. Do not center seams, perpendicular to, in the path of travel to doors.

F. Install specified edging wherever floor mating abuts a dissimilar flooring material, except where wood thresholds, or resilient floor tile trim occurs.

3.4 CLEANING

A. Daily clean work areas by sweeping and disposing of debris, and scraps.

B. After completion of the work of this Section, remove equipment, and clean all wall, partition, and floor areas free from deposits of adhesives and other materials installed under this Section.

C. Clean work under provisions of Section 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS.

1. Clean and vacuum floor mat surfaces upon completion of the installation.

3.5 PROTECTION

A. Protect finished work under provisions of Section 015000 - TEMPORARY FACILITIES AND CONTROLS.

B. Prohibit traffic from floor mat areas for 24 hours after installation.

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END OF SECTION

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SECTION 21 00 00

FIRE SPRINKLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

General Provisions of Contract, including General and Supplementary conditions and General Requirements (if any) apply to work specified in this Section.

1.2 DEFINITIONS

A. Reviewed equal: Shall mean that the Engineer, not the contractor, shall make final determination whether materials are an equal to that which is specified.

B. Equal: Shall mean essentially the same as that product specified, but a model of a different manufacturer.

C. Concealed: Shall mean in walls, in chases, above ceilings, within enclosed cabinets, otherwise enclosed.

D. Exposed: Shall mean in finished spaces, in closets, under counters, behind and/or under equipment and/or otherwise visible.

E. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

F. Others: Shall mean provided by sections other than this section. If not purposely assumed by another section, shall be provided by the Contractor.

G. Materials: Shall mean any product used in the construction, including but not limited to: fixtures, equipment, piping and supplies.

H. Piping: Shall mean pipe, fittings, hangers and valves.

I. Provide: Shall mean the furnishing and installing of materials.

J. Substitution: Shall mean materials of significantly different physical, structural or electrical requirements, performance, dimensions, function, maintenance, quality or cost, than that specified.

1.3 ALTERNATES

There are NO alternates that apply to this section of the project.

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1.4 DESCRIPTION OF WORK

A. Work Included

Provide all design services, construction documents, labor, transportation, equipment, permits, materials, tools, inspections, incidentals, tests and perform all operations in connection with the modification of the existing Sprinkler System to provide coverage for new partition locations. The existing system must remain active until the new work is operational. The Job will be done in two phases. See Architectural drawings for phasComply with requirements of all Authorities Having Jurisdiction. Comply with Local Sprinkler Ordinances. Include aesthetic considerations into the design. Coordinate with interfacing trades. Submit equipment and components for review. Prepare Shop and Record Drawings and Owner's Manuals. Assure quality of workmanship. Provide guarantees and warranties.

1. Automatic Sprinkler Systems shall meet the standards of the most recent edition of the National Fire Protection Association's (NFPA) NFPA 13 Standard for the Installation of Sprinkler Systems.

1.5 SUBMITTALS

A. Shop Drawings:

1. Within 30 working days after the Contractor has received a fully executed contract, prepare and submit Plans / Shop Drawings in accordance with the requirements of NFPA and obtain the Engineer's approval and Owner's Insurance Underwriter approval before proceeding with the fabrication and work.

2. Drawings shall include, but not be limited to:
   a. Name of Owner and Occupant
   b. Name and address of Contractor.
   c. Physical Location
   d. Plan view of system
   e. Full height cross section of the building with sprinkler work shown including ceiling construction and spray obstructions.
   f. Locations of all partitions, with fire partitions noted.
   g. Occupancy class for each area and minimum density of water application.
   h. Locations of concealed spaces
   i. Plan showing location and size of city water main, where private main attaches, all valves, distance and elevation between main and riser.
   j. Recent hydrant test showing both static and residual pressures, and date and time taken. List any significant known daily or seasonal pressure fluctuations and the cause.
   k. Make, model and nominal K factor of sprinkler heads.

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l. Control valves, check valves, drain pipes and test connections.
m. Fire department connections
n. Details showing riser piping configurations.
o. Pipe sizes.
p. Switches and supervisory devices.
q. Interface with Fire Control Panel.

3. To obtain an electronic copy of the building plan and sections, contact the Engineer. Specify required CAD format when requesting the files.

4. Procedure

a. As soon as possible after award of Contract, before any material or equipment is purchased, this Contractor shall submit to the Engineer no less than six (6) copies for approval. Shop drawings shall be properly identified and shall describe in detail the material and equipment shall be provided, including all dimensional data, performance data, curves, computer selection print-outs, etc.

b. Corrections or comments made on the submittals do not relieve the contractor from compliance with requirements of the specification. Shop drawing review is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades and performing his work in a safe and satisfactory manner.

c. All related items shall be submitted as a package.

4. Submit data on the following items:
a. Piping, fittings and couplings.
b. Alarm check valves and trim.
c. Backflow preventer.
d. Valves and supervisory devices.
e. Sprinkler heads and escutcheon plates.
f. Supports, hangers and accessories.
g. Fire Department Connections.
h. Any other significant item valued over $100.00

5. Submit to the Owner's Insurance Underwriter sufficient copies for approval to allow one copy to be incorporated into each Owner's Manual in addition to the required As-Built Plans

1.6 HYDRAULIC DESIGN DATA

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A. Water Density and Square Foot Requirements: Provide per NFPA.

B. Codes and Requirements:

1. Comply with the standards of most recent edition of the National Fire Protection Association.

2. Comply with the BOCA International Building Code, International Fire Code all State laws as well as local codes and ordinances.

3. Comply with the requirements of the State's Fire Marshal's Office, Local Fire Chief, Owners Insurance Underwriter, Local Water District and other Authorities Having Jurisdiction without additional cost to the Owner.

1.7 GUARANTEE

This Contractor shall guarantee all materials and workmanship furnished by him or his sub-contractors to be free from all defects for a period of no less than one (1) year from date of final acceptance of completed system and shall make good, repair or replace any defective work which may develop within that time at his own expense and without expense to the Owner.

1.8 MAINTENANCE MANUAL

On completion of this portion of the work, and as a condition of its acceptance, submit for review two copies of a manual describing the system. Prepare manuals in durable 3-ring binders approximately 8.1/2" by 11" in size with at least the following:

A. Project name on the spine and front cover, and identification on the front cover stating the project name, general nature of the manual, and name, address and telephone number of the General and Sprinkler Contractors.

B. Neatly typewritten index.

C. Complete instructions regarding operation and maintenance of all equipment involved.

D. Complete nomenclature of all frequently replaceable parts and supplies, their part numbers, and name, address and telephone number of the vendor.

E. Copy of all guarantees and warranties issued, and dates of expiration.

F. Shop drawings and equipment/fixtures manufacturer's catalog pages.

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PART 2 – PRODUCTS

All products shall be new and must be either Factory Mutual (FM) or Underwriters' Laboratory (U.L.) listed or both.

2.1 MANUFACTURERS

A. Equipment: Grinnell, Standard, Viking, Central Sprinkler Corp., Reliable, or equal.

B. Heads: Viking, or equal.

C. Flow Switch and Supervisory Device: Potter Electric Signal Company or equal.

D. Backflow preventer: Ames or equal.

2.2 MATERIALS

A. Piping:

1. Inside building: Shall be schedule 40 black steel, standard weight welded, threaded or Victaulic fittings for sizes 2-1/2" and under. Install flanged fitting and flanges at valves and where required. Threadable light wall pipe (schedule 10) shall be permitted only for sizes 3" and over.

2. Where permitted by code, and based on the construction, the contractor may substitute CPVC sprinkler system piping in lieu of the above for the wet sprinkler system. Install according to manufacturer's requirements and restrictions. Piping and fittings shall be Harvel Blazemaster CPVC fire sprinkler piping. Piping shall be installed only by a factory trained and certified installer. Do not use where piping is exposed or where manufacturer's requirements cannot be met.

B. Sprinkler Heads:

1. Temperature Classification:
   a. Shall be ordinary temperature rating.
   b. Any Boiler /mechanical and generator room shall be Intermediate temperature rating 175° F to 225° .

2. All shall be Quick Response bulb type head.

3. Type:
   a. New Finished spaces with ceilings shall have recessed heads
   b. Match existing heads in rooms that have both new and existing heads, or replace old heads to math new.
   c. Concealed spaces shall be the type best suited for the configuration of the individual space.
   d. Any minor unheated spaces shall be dry type.

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4. Provide and install a spare head case per NFPA requirements. The case shall contain not less than 12 heads total, no less than two of each style of heads and one wrench for each style of head. Locate case in the sprinkler room near the check valve assemblies.

C. Hangers: Provide per NFPA. Provide seismic protection unless specifically exempt by the Authority Having Jurisdiction. Hang from building structure, not piping of other trades.

D. Sleeves:

1. Pipes Through Floors: Form with Schedule 40 (galvanized) steel pipe and extend 1" above surrounding floor.

2. Pipes Through Interior Fire-rated or Sound-rated Partitions: Form with steel pipe or 16 gauge galvanized steel.

3. Pipes through Exterior Building Walls, Concrete Walls or Footing: Form with Schedule 40 (galvanized) steel pipe.

4. Size: The minimum sleeve diameter shall be either 2 pipe sizes or 2" in diameter larger than the outside diameter of the pipe.

5. Fire caulk all penetrations through floors and fire rated partitions.

E. Valves:

1. Riser Control Valve: OS&Y cast iron construction.

2. Sectionalizing Valves: OS&Y cast iron body.

3. Drain and Test Valves: Bronze body, gate type or ball type, capable of being padlocked in either open or closed position.

F. Provide all miscellaneous items required for a complete system, such as: paint, signs, valve tags, pipe markers, chains and locks, relief valves, and water additives.

2.3 COMPONENTS

A. Fire Department Connection (Verify with local Fire Department). 4" Fire Department connection with, caps with chains and wall plate with "Auto Sprinkler". Thread Pattern shall match that of the local Fire Department equipment; also 4" UL listed check valve with automatic ball drip piped to drain. Bronze finish.

B. Flow Switches for Wet Systems: Model # VSR-F vane type water flow alarm switch with an adjustable retard setting from 10 seconds to 90 seconds having two sets of DPDT contacts for reporting to the building fire alarm system.

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C. Electric Supervisory Switches: All valves shall have a Model # OSYSU-2 electric supervisory device with 2 sets of DPDT contacts to report to the building fire alarm system.

D. Backflow preventer: Double check, testable, replaceable seats.

E. Provide all shut-off valves with tamper switches. Lock or chain open valves with break-away padlocks.

F. Water pressure gauge: Provide one before the valve on each inspectors test connection. Range applicable to fire protection application.

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PART 3 – EXECUTION

3.1 PREBID EXAMINATION AND INVESTIGATION

A. Visit the site and become acquainted with the conditions. Study all Drawings and Specifications for all related and interfacing trades. No claim will be recognized for extra compensation due to failure to become familiarized with the conditions and extent of the proposed work as indicated within.

B. Ascertain all Authorities Having Jurisdiction, and consult where needed.

3.2 OBTAINING DRAWINGS AND SPECIFICATIONS

A. Obtain a FULL set of drawings and specifications as soon as is practical.

3.3 SPECIFIC INSTALLATION REQUIREMENTS

A. For aesthetic reasons ALL PIPING SHALL BE RUN CONCEALED, locate sprinkler heads neatly and symmetrically, relative to the walls, diffusers and light fixtures. .

B. All piping shall be run as high as practicable. Pitch piping slightly to allow the system to be drained.

C. System drains shall be valved and piped to discharge. No valve shall be provided ahead of the electric alarm devices.

E. All sprinkler work shall avoid proposed locations of, and installation clearances for, lighting, ducts, piping, framing and equipment.

F. All concealed spaces, including both levels of the attic, must be sprinkled.

3.4 COORDINATION

A. Coordinate work with that of other trades. Coordinate early for locations of mains. Ductwork, mechanical equipment, electrical panels and large gravity piping will be given priority over sprinkler piping, unless all affected parties agree otherwise

B. Contact Electrical Contractor and assure that all requirements for power and fire alarm system have been met.

3.5 TESTS

A. The entire installation shall be tested with water in accordance with all NFPA requirements, all requirements of the local Fire Department and local Water District; and the Owner's Insurance Underwriter; this includes the testing of all alarms.

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SECTION 22 00 00

PLUMBING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings, Addenda, General Provisions of Contract, including General and Supplementary conditions and General Requirements apply to work specified in this Section.

1.02 DEFINITIONS

A. ADA: Designed to meet the requirements of the Americans with Disabilities Act.

B. Adaptable: Designed so in the future it can be easily adapted to meet most of the essential requirements of the Americans with Disabilities Act with minor additions and adjustments, such as change of height of counter or addition of a lift seat.

C. Concealed: Shall mean in walls, in chases, above ceilings, within enclosed cabinets, otherwise enclosed.

D. Equal: Shall mean essentially the same as that product specified, but a model of a different manufacturer

E. Exposed: Shall mean in finished spaces, in closets, under counters, behind and/or under equipment and/or otherwise visible.

F. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

G. Materials: Shall mean any product used in the construction, including but not limited to: fixtures, equipment, piping and supplies.

H. Others: Shall mean provided by sections other than this section. If not purposely assumed by another section, shall be provided by the Contractor.

I. Piping: Shall mean pipe, fittings, hangers and valves.

J. Provide: Shall mean the furnishing and installing of materials.

K. Reviewed equal: Shall mean that the Architect or a designated Consultant, not the contractor, shall make final determination whether materials are an equal to that which is specified.

L. Substitution: Shall mean of materials of significantly different physical, structural or electrical requirements, performance, dimensions, function, maintenance, quality or

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durability, than that specified.

1.03 ALTERNATES

There are NO alternates that apply to this section of the project.

1.04 DESCRIPTION OF WORK

A. Work Included

1. Furnish all labor, materials, equipment, transportation, and perform all operations required to install complete plumbing systems in the building renovation area, in accordance with these specifications and applicable drawings.

2. Provide the following:

a. Sanitary, waste and vent systems.
b. Domestic hot and cold water system.
c. Dental compressed air and vacuum systems.
d. Pipe, valve and fittings
e. Water specialties
f. Drainage specialties
g. Plumbing fixtures and accessories
h. Insulation
i. Installation and/or connections to fixtures/equipment provided by others.

3. Specifications and accompanying drawings do not indicate every detail of pipe, valves, fittings, hangers, fixtures and equipment necessary for complete installation; but are provided to show general arrangement and extent of work to be performed.

1.05 PERMITS

A. This Contractor shall be responsible for providing and filing all Plans, Specifications and other documents, pay all requisite fees and secure all permits, inspections and approvals necessary for the legal installation and operation of the systems and/or equipment furnished under this Section of the Specifications.

B. The Contractor shall frame under glass/ clear plastic all permits, secured by him, adjacent to the respective system and/or equipment and required to be displayed by Code, law or ordinance. Those permits secured but not required to be displayed shall be laminated in plastic and included in the Owner's maintenance manual.

1.06 CODES AND ORDINANCES

A. All work performed under this Section of the Specifications shall be done in accordance

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with applicable Federal Laws, Maine State Laws, Uniform Plumbing Code, Subsurface Wastewater Disposal Rules, and local plumbing codes and ordinances. The following standards are also to be followed when applicable:

ADA	Americans with Disabilities Act
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
NFPA	National Fire Protection Association (a.k.a. NFC, National Fire code)
NEMA	National Electrical Manufacturer's Association
OSHA	Occupational Safety and Health Act
UL	Underwriter's Laboratories

B. If an obsolete code section or standard is specified, the latest replacement issue of each Code or standard for the application, in effect at the time of bidding, shall be used. Code requirements are the minimum quality and/or performance acceptable. Where the Specifications and/or Drawings indicate more stringent requirements, these requirements shall govern.

1.07 QUALITY ASSURANCE

A. Use sufficient qualified workmen and competent supervisors in execution of this portion of the work to ensure proper and adequate installation of the system throughout. Work performed shall conform to manufacturers' recommendations, good standard practice and industry standards.

B. Technical training of workmen installing the systems specified, by the systems manufacturer, shall be mandatory prior to commencement of work. Documentation of such certification shall be made available to the Architect upon request within 5 business days

C. Any work deemed unacceptable by the Engineer, Architect or Clerk of the Works shall be redone correctly, at no additional cost to the owner.

1.08 ELECTRONIC DRAWINGS AND FILE SHARING

Plans and specifications may be made available in electronic format on request. Plans may be provided in either Adobe (.pdf) or CAD (.dwg or .dxf) formats and will be compressed using WinZip (.zip format). Recipient is responsible to obtain the necessary software to open the files. Note: CAD drawings will be made available to successful bidders only after a contract is awarded.

CAD drawings are produced with AutoCAD 2006 and may be provided in either the 2000 or 2004 file formats. Upon request for CAD files a release form will be provided which must be signed and returned to the Engineer prior to transmission of electronic files. Physical mailing address, telephone numbers and e-mail address for this office are indicated on each drawing. A signed release will not be required for Adobe based files.

All contract documents are copyrighted material. No portion of materials may be reproduced or

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duplicated except as indicated in the release form. Where release forms are not required (Adobe based files), materials may be printed for use by the intended recipient only and may not be reproduced or copied in any other manner unless written permission is obtained.

1.09 MATERIALS AND SUBSTITUTIONS

All materials and equipment shall be new and of the latest design of respective manufacturers. All materials and equipment of the same classification shall be the product of the same manufacturer, unless specified otherwise.

A. Any proposal for substitution of Plumbing equipment shall be made in writing PRIOR TO OPENING OF BIDS. Submit full details for consideration and obtain written approval of the Architect. The phrase "or approved equal" shall be intended to mean that the Architect, not the contractor, shall make final determination whether or not substitute materials are an equal to that which is specified. The contractor shall be responsible to certify within his submittals that any equipment to be considered as an "approved equal" meets or exceeds the requirements of this specification in all aspects and will physically fit within the space provided and still provide adequate space adjacent to the equipment for service. If requested by the Architect the contractor shall provide said certification in the form of scale drawings before review will be made. Architect will not be responsible to provide drawings for substituted materials unless the substitution is agreed upon prior to opening of bids. Architect's decision on acceptability of substitute materials shall be final.

B. Approval by Architect for such substitution shall not relieve the Plumbing Contractor from responsibility for a satisfactory installation and shall not affect his guarantee covering all parts of work

C. Any material or equipment submitted for approval which are arranged differently or is/are of different physical size from that shown or specified shall be accompanied by shop drawings indicating different arrangements of size and method of making the various connections to equipment. Final results will be compatible with system as designed.

D. Materials and equipment determined as an “approved equal” and /or substitutions must meet the same construction standards, capacities, code compliances, etc. as the equipment (i.e. manufacturer, model, etc.) specified.

E. Any additional cost resulting from the substitution of equipment shall be paid by this Contractor.

1.10 PLANS AND SPECIFICATIONS FOR SUPPLIERS

This Contractor shall provide his Suppliers, and any related subcontractors, with a copy of the specification pages, and letter sized photocopies of equipment details and schedules, that pertain to the item to be supplied.

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1.11 SHOP DRAWINGS & SUBMITTALS

A. As soon as possible after award of Contract (but not longer than 21 calendar days), before any material or equipment is purchased, Plumbing Contractor shall submit to the Architect no less than ten (10) copies of shop drawings for approval. If shop drawings are not submitted within the allotted time frame all substitutions included the late shop drawings will be invalid and the equipment specified must be provided. Any costs resulting from delays in the project schedule due to failure to submit shop drawings related to this section in a timely manner shall be the responsibility of the Plumbing Contractor.

B. Each item shall be properly identified, preferably by fixture/equipment tag number (such as WC-3), and shall describe in detail the material and equipment to be provided, including all dimensional data, performance data, pump curves, computer selection print-outs, etc. Capacities indicated are minimums. Equipment submitted with capacities below specified parameters will be refused.

C. Corrections or comments made on the shop drawings do not relieve the contractor from compliance with requirements of the drawings and specifications. Shop drawing review is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades and performing his work in a safe and satisfactory manner.

D. Should any materials or products be purchased and/or installed without prior review and comment the contractor shall be required to remove or replace those products and/or materials if directed by the Architect at his own expense. If the materials are not removed (or replaced) or if the project is delayed as a result the Architect reserves the right to order the withholding of payment until the situation is resolved in a manner satisfactory to the Architect.

E. Plumbing shop drawings shall be separate from Mechanical shop drawings. All submittals shall have a clear area on the front no less than 4 inches x 3 inches to be reserved exclusively for the Engineers' shop drawing stamp or they will be refused for re-submittal.

F. It is desirable for shop drawings to be submitted electronically, including all documentation outlined in paragraph “A” above. Hard copies of shop drawings must be original documents or good quality photocopies of original documents (photocopies of color samples are not acceptable). Faxed copies of submittal sheets will be refused.

G. Review must be obtained on all items specified in Section 2 Products or shown on the drawing, and any significant items implied or otherwise required but not specified.

H. Format

1. Related items shall be stapled or Bound together as a package. The number of copies of each package shall be as listed above. Examples of packages of related items include:

a. Hangers and Supports

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b. Identification
c. Insulation
d. Valves
e. Piping
f. Plumbing Fixtures with accessories
g. Drainage Specialties
h. Water Specialties
i. Pumps

2. If due to circumstances beyond his control, the contractor is unable to include all the related items in the submitted package, he shall insert in its place a plain sheet of paper with a notation stating that the item will be submitted separately.

1.12 PRODUCT HANDLING

Use all means necessary to protect materials before, during and after installation, and to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

1.13 AS-BUILT DRAWINGS

Keep in good condition at the job, apart from all other prints used in actual construction, one complete set of all blueprints furnished for this job. On this special set of blueprints, record *completely and accurately* all differences between the work as actually installed and the design as shown on the drawings. These record prints must be kept up to date by recording all changes within one week of the time that the changes are authorized. At the completion of the work, this set of drawings shall be delivered to the Architect for the Owner electronically in the form of CAD drawings. If a complete record of changes is not made and electronic CAD drawings not provided by the Plumbing Contractor, a record shall be made by the Engineers, and *the cost of the record shall be paid by the Plumbing Contractor*. Copies of the plumbing CAD drawings may be made available electronically to the Contractor if desired. Drawings shall be dated accordingly and clearly identified as "AS-BUILT". Contact the Architect directly or the Engineer via e-mail at mechsyst@maine.rr.com. Specify required CAD format when requesting the files. CAD drawings were generated using AutoCAD 2006 and utilize both paper space and model space with external references to various other drawings. Files will be compressed and will require "WinZip" (http://www.winzip.com) for extraction. A release form will be provided which must be signed and returned to the Engineer prior to transfer of files.

1.14 MAINTENANCE MANUAL

On completion of this portion of the work, and as a condition of its acceptance, submit for review two copies of a manual describing the system. Plumbing equipment manuals shall be separate from mechanical manuals. All manuals shall be original copies, not photocopies, or they will be refused for resubmittal. Prepare manuals in durable 3-ring binders approximately 8.1/2" by 11" in size with at least the following:

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A. Project name on the spine and front cover, and identification on the front cover stating the project name, general nature of the manual, and name, address and telephone number of the General and Plumbing Contractors.

B. Neatly typewritten index.

C. Complete instructions regarding operation and maintenance of all equipment involved.

D. Complete nomenclature of all frequently replaceable parts and supplies, their part numbers, and name, address and telephone number of the vendor.

E. Copy of all guarantees and warranties issued, and dates of expiration.

F. Shop drawings and equipment/fixtures manufacturer's catalog pages. Clearly indicate the precise item included in this installation and delete, cross out or otherwise clearly indicate, all manufacturers' data with which this installation is not concerned.

1.15 OBJECTIONABLE NOISE AND VIBRATION

All equipment shall operate without objectionable noise and vibration. Should objectionable noise or vibration be transmitted to any occupied part of the building by apparatus or piping, as determined by the Architect, the necessary changes eliminating the noise or vibration shall be made by this Contractor at no extra cost to the Owner.

1.16 GUARANTEE

This Contractor shall guarantee all materials and workmanship furnished by him or his sub-contractors to be free from all defects for a period of no less than one (1) year from date of final acceptance of completed system and shall make good, repair or replace any defective work which may develop within that time at his own expense and without expense to the Owner. Any additional costs required to extend manufacturer's guarantee and warranty for the period specified, shall be included in Contractor's base bid.

1.17 DEVIATIONS, DISCREPANCIES AND OMISSIONS

A. The drawings are intended to indicate only diagrammatically the intent, extent, general character and approximate locations of plumbing work. Work indicated, but having details obviously omitted, shall be furnished complete to perform the functions intended without additional cost to the Owner. This shall include but not be limited to:

1. All items that are required to meet all applicable codes and referenced standards.

2. Piping for cold and hot water supply, drain, vent, gas, etc. to each plumbing fixture/equipment shown on the drawings, or scheduled as required.

3. Shut-off valves on lines feeding individual fixtures without integral stops.

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4. Minor single phase electrical wiring, or control wiring, between Plumbing provided items that require it, unless indicated on the Electrical Drawings.

5. Plumbing related items indicated on the drawings of other trades.

6. Items indicated on one plumbing drawing but not shown on a corresponding drawing.

7. Items implied on the plumbing drawings but not shown.

8. All plumbing related items clearly shown in dark print on the Plumbing drawings but not included in the specification, unless it is noted as being provided by the owner or other contractor or unless other sections assume the responsibility.

B. The drawings and specifications are complimentary to each other and what is called for in one shall be as binding as if called for by both. In the event of conflicting information on the drawings, or in the specifications, or between drawings and specifications, or between trades, that which is better, best, most expensive, or most stringent shall govern.

1.18 WORKPLACE SAFETY

A. The Trade Contractor alone shall be responsible for the safety, efficiency and adequacy of his plant, appliances and methods, and for any damage, which may result from their failure of their improper construction, maintenance, or operation.

1.19 CHANGE ORDERS

A. No change shall be made from the work, equipment, or materials under this section except as directed in writing by the Architect or Engineer of record.

B. All requests for change in contract price and scope shall be accompanied by a breakdown list of materials with unit and extended prices and labor hours with unit and extended price, plus markups that have been applied.

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PART 2 - PRODUCTS

2.01 GENERAL

A. Unless otherwise indicated, the materials to be furnished under this contract shall be new and the standard products of manufacturers regularly engaged in the production of such equipment, and shall be the manufacturer's latest standard design that complies with the specification requirements.

B. All materials and equipment of the same classification shall be the product of the same manufacturer, unless specified otherwise. An entire product line may be rejected if one, or more, of the products submitted is not an equal to that specified.

C. Unspecified items shall be by the same manufacturer and level of quality and as similar items specified, whenever possible. Whenever items have no similarity to those specified in this section, provide the equivalent item as specified in other specification sections. When no similarity exists in other sections, the Contractor shall submit for review an appropriate commercial/institutional quality item, complete to perform the functions intended, using his best discretion. The Architect or a designated Consultant, not the contractor, shall make final determination whether materials are of suitable quality and perform the functions intended.

2.02 HANGERS AND SUPPORTS

A. General

1. All hangers and supports shall be especially manufactured for that purpose and shall be the pattern, design and capacity required for the location of use.

2. Piping specified herein shall not be supported from piping of other trades.

3. All steel hangers shall be factory painted.

4. Hangers shall be heavy-duty steel adjustable clevis type, plain for steel, cast iron and plastic pipe, and copper plated for piping in direct contact with copper tubing (i.e. copper hot water piping) shall be equal to Carpenter & Paterson Inc., Fig. 100 (Fig. 100CT copper plated).

5. Hangers shall go outside of insulation for domestic water piping. Each hanger shall be furnished with metal shield; Fig. 100 SH.

6. Exposed vertical risers ¾ inch and smaller shall be supported at 6 foot intervals between floor and ceiling with split ring type hangers; copper plated for piping in direct contact with copper tubing equal to Carpenter & Paterson Inc., Fig.81 (Fig. 81CT copper plated). ALL PIPING DROPS TO FIXTURES SHALL BE ANCHORED SOLID TO WALL WITH A STEEL SUPPORT BRACKET WITH ADJUSTABLE CLIP, ESPECIALLY PIPING TO FLUSH VALVES

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7. Piping suspended from walls and partitions shall be supported by steel support bracket with adjustable clips equal to Carpenter & Paterson Inc., Fig. 69. All attachments to bar joists shall be from top chord.

B. Hanger Rods & Attachments

1. Hanger rods shall be galvanized all thread rod. Rod size shall be as follows:

Pipe Size	Rod Size
3/8" to 2"	3/8"
2.1/2" to 3.1/2"	1/2"
4" to 5"	5/8"
6"	3/4"

2. All nuts for hanger rods and hangers to be galvanized steel.

3. Provide lag points with rod couplings for fastening to wood, toggle bolts in concrete blocks and compound anchor shields and bolts in poured concrete.

4. Provide toggle bolts with rod couplings for fastening in the pre-cast concrete plank decks.

5. Provide and install angle iron supports for pipe hangers in locations as required. Angle iron supports shall be adequate size for span and piping or equipment.

6. Hot and cold water piping at each fixture shall be securely fastened in wall with split ring type hanger fastened to studs within wall.

2.03 SEISMIC RESTRAINT

All seismic restraints shall be in accordance with the International Building Code.

2.04 IDENTIFICATION

A. Tag each new pump /equipment, and switch with 2½ inches x ¾ inch rectangular engraved nameplates with white letters on black, #2060-20 by Seton Name Plate Corp. or reviewed equals. Nameplates shall be mechanically fastened to equipment (adhesives are not acceptable). Embossed labels are not acceptable.

B. Identify all new water and drain piping with "Set Mark" snap-around pipe markers by Seton Name Plate Corporation or reviewed equal. Markers shall include both identification and arrows indicating direction of flow. Markers shall be placed on pipe segments 5 feet and longer, and spaced no less than 10 feet apart. Heating hot water piping shall be labeled differently from Domestic hot water piping. On parallel runs of piping, plumbing markers shall be grouped together, and grouped with heating markers whenever practical.

Legend	Background/Letter Color
"Cold Water"	Green/ white letters

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"Domestic 120°F Water"	Yellow/ black letters
"Domestic 120°F Return"	Yellow/ black letters
"Domestic 140°F Water"	Yellow/ black letters
"Compressed air"	Yellow/ black letters
"Plumbing Vent"	Green/ white letters
"Sanitary Drain"	Green/ white letters

C. Tag all new valves with Seton #M4506 1½ inch square brass tags and #6 bead chains, stamped with the following identification: "CW", "HW", "HWR" or "140HW". Tag shall be consecutively numbered. DO NOT DUPLICATE EXISTING VALVE IDENTIFICATION NUMBERS. Fixture stops, control valves or valves adjacent to equipment, the use of which is obvious, are not to be tagged.

D. Provide valve charts identifying valve number, valve identification and service (i.e. Apt. 203, HW). Mount charts in Boiler Room and Mechanical Room in 8½ inch x 10 inch and 8½ inch x 11 inch self-closing aluminum frame with plastic windows. Provide additional copies for maintenance manuals.

2.05 INSULATION

A. All Domestic Water Piping, and any Storm Water Piping

1. Exposed Piping: Insulate exposed piping above slab/grade with Owens Corning Evolution SSL II paper free ASJ with tough, wrinkle resistant, easy to-clean jacket, or approved equal. Install will great care for appearance, turning any writing or seams toward the wall. Or reviewed equal.

   a. Option: use standard Owens Corning fiberglass insulation with ASJ or approved equal, and carefully and neatly cover it with a white PVC plastic covering material. Covering shall be applied in no less than 4 foot lengths with shingle joints. Longitudinal joints shall be on the top or back sides so as to be out of sight and sealed with adhesive materials provided with the jacketing. Material shall be butted to finish walls or Insulation. Jacketing material shall be Zeston pre-cut, pre-curled 0.030 thickness. Or reviewed equal.

2. Concealed piping and piping in Mechanical rooms: Insulate with well installed and sealed Armaflex Pipe Insulation with pressure sealing lap adhesive, or equal.

   a. Option: use standard Owens Corning fiberglass insulation with ASJ or approved equal.

3. Thickness as follows:
   a. Hot water mains, recirculated hot water branches and recirculation returns: 1 inch thick minimum.
   b. Unrecirculated hot water branches: 1" thick.
   c. Cold water piping: ½" thick minimum.
   d. Pex run-outs to individual fixtures, any temperature (if any): ½ inch thick to allow bending.

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e. Storm Water Piping: 1" thick minimum.

4. Insulate any below grade hot water piping run outs with ½" Armaflex closed cell piping insulation.

B. Fittings

1. All fittings and valves shall be covered with a one piece PVC insulated fitting cover secured.

2. The ends of insulation on exposed pipes at valves, flanges, unions, etc., shall be finished neatly with covering to match jacket and secure with mastic.

3. Valves, flanges and unions on hot water piping shall not be insulated.

C. Installation

All insulation work shall be executed by skilled insulation workmen regularly in the trade.

2.06 VALVES

A. General

1. Valves shall be provided as shown and as required to make the installation and its apparatus complete in operation; locate to permit easy operation, replacement and repair.

2. All valves must be so constructed that they may be repacked under pressure while open.

3. Check valves shall be installed in all lines where flow may reverse from intended direction.

4. Valves shall have name and/or trademark of manufacturer as well as working pressure stamped or cast on valve body.

5. Valves shall comply with Manufacturer's Standards Society (MSS) specifications and be so listed.

B. Types and Manufacturers

All valves shall be of one manufacturer and by one of the manufacturers listed. The following list is provided as a means of identifying the quality and type required.

1. Ball valves 1½ inches in size and larger

Shall have bronze bodies, Type 316 stainless steel stems and balls, reinforced Teflon seats and seals, blowout proof stems and adjustable stem gland. Shall be equipped with suitable packing for service intended. Ports shall be "conventional

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port". Rated for 400# WOG and 350°F:

	Soldered Ends	Screwed Ends
Apollo	70-200	70-300
Watts	B-6000-SS	B-6001-SS
NIBCO	S-585-66	T-585-66
Hammond	8514	8503

2. Check Valves 2 inches in size and smaller

Shall be horizontal swing type with bronze body, Teflon disc. Rated for 125# WSP, 200# WOG:

	Soldered Ends	Screwed Ends
Milwaukee	1509-T	509-T
Stockham	B-310-T	B-320-T
NIBCO	S-413-Y	T-413-Y
Hammond	IB945	IB904

3. Spring loaded check valves 2" and smaller:

Bronze body, bronze trim, stainless steel spring, stainless steel center guide pin, Class 125, Teflon seat unless only bronze available.

	Solder or Screwed Ends
ConBraCo	61 series
Grinnell	3600SJ
Mueller	203BP
Nibco	S480Y
Val-Matic	S1400 series.

4. Drain Valves

Shall be conventional ball valves and provided with hose nipples and threaded metal cap on chain. Watts B-6001-CC or reviewed equal.

2.07 DOMESTIC WATER PIPING

A. Interior Exposed, High temperature and Supportive

1. All exposed piping carrying domestic water, all piping with a temperature above 140 deg. F., all piping supporting inline equipment, and piping within 6 ft of the water heaters, shall be hard-drawn type "L" copper tube with cast or wrought fittings and made up with Silvabrite 100 lead-free solder. Care shall be taken not to over flux.

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B. Interior Concealed

All concealed hot (below 141) and cold water piping above finish floor (not buried) shall be one of the following:

1. Type L Copper and fittings, all sizes

2. Flowguard Gold CPVC pipe and fittings, all sizes.

2. PEX, sizes 1-1/2" and smaller

   a. Uponor AquaPEX (PEX-a) (cross linked polyethylene tubing) piping and cold expansion fittings, specifically designed for domestic water. ASTM F 876, Fittings for PEX Tube: ASTM F 1960, insert type and matching PEX tube dimensions. Manifold (if used): Uponor multiple-outlet, corrosion-resistant assembly.

   b. Piping shall be installed in a neat and orderly manner. No wild spaghetti installations will be tolerated. Piping shall be run straight and parallel, and level or sloped slightly to low points with no droops exceeding 1/8". Use PEX bend supports to keep turns tight and steel channel supports to keep piping supported. Any work that in the opinion of the Architect or Engineer of Record that does not meet these standards will be removed and redone at the Contractor's expense.

   d. All PEX piping shall be insulated as indicated under Insulation. Use Armaflex insulation on piping run outs to individual fixtures to allow bending.

   e. Provide the correct spacing of hangers (w/ saddles) for PEX; every 3' or as recommended by the Manufacturer. Do not use the spacing designated for CPVC or copper piping unless using steel u-shaped support channels under insulation. Provide a support bracket at rough-ins.

   f All work shall be done in accordance with the manufacturer's recommendations.

4. All buried water and trap primer piping shall be AquaPEX or type "K" soft copper tubing. No joints below slab.

5. All buried hot water piping shall be insulated and sealed with ½" Armaflex. **Do not direct bury copper hot water piping.**

6. All exposed, uninsulated water piping near fixtures in finished areas shall be chromium plated I.P.S. copper or red brass pipe or tubing and fittings. Valves shall also be chrome plated brass or bronze. Any chrome trim with wrench marks shall be removed and new trim installed.

7. Type of tubing shall be stamped or printed on each length by Manufacturer.

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2.08 SANITARY WASTE AND VENT PIPING

A. All Vent Piping, and Sanitary Waste Piping

Piping and fittings shall be PVC Schedule 40 polyvinyl chloride plastic, as per ASTM-A-2665 or latest standard. Solvent as per ASTM-D-2564.

2.09 PIPE SLEEVES AND ESCUTCHEONS

A. Sleeves

1. Contractor shall set sleeves for all piping penetrating walls and floors. Sleeves through masonry shall be steel pipe sleeves two sizes larger than pipe. Piping passing through walls other than masonry shall be provided with # 24 gauge galvanized steel tubes with wired or hemmed edges.

2. Sleeves set in concrete floors shall finish flush with underside, but extend minimum of 1 inch above finish floor. Weld clips to sleeves for support in concrete pre-cast planks of a size that will be covered by concrete topping. Sleeves set in partitions shall finish flush with each side.

3. Space between sleeves and pipes shall be sealed to make smoke and water tight with 3M Brand Fire Barrier Caulk CP25 or Putty 303.

4. Masonry sleeves shall be Schedule 40 steel pipe.

5. This Contractor has the option to use the Pro-set system on lieu of the above.

B. Exterior Sleeves

Where piping passes through exterior walls, provide and install a complete pipe sleeve/hydrostatic wall closure system.

1. Wall sleeve shall be schedule 40 steel pipe, two pipe sizes larger than carrier pipe. Sleeve shall be the same length as the thickness of the wall served.

2. The hydrostatic closure device shall consist of identical interlocking links of solid synthetic rubber compounded to resist ozone, water, chemicals and extreme temperature variations. Each link shall be connected by corrosion resistant bolts and nuts to form a belt that is to fit snugly around the pipe. Under each bolt and nut there shall be a metal pressure plate so that when each nut is tightened the rubber links will expand between the pipe and sleeve to form a continuous, air tight and water tight seal.

3. Units to be Link-Seal system Model LS wall seal by Thunderline Corp. or reviewed equal.

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C. Escutcheons

Where piping passes through finish walls, floors, ceilings and partitions, provide and set two piece nickel plated steel floor and ceiling plates.

2.10 PLUMBING FIXTURES

A. LV-1 Lavatory, Wall Mounted - ADA

1. AMERICAN STANDARD 355.012 Lucerne wall hung lavatory, for wall hanger or concealed arm support, 4” centers, vitreous china, front overflow, self-draining deck, color “white”. Or reviewed equal.

2. Moen 8279MF12 4" centerset wrist blade handle gooseneck faucet, 1.2 GPM laminar flow, cast brass, 5-1/4" spout reach. Or reviewed equal.

3. Brass P-trap, chrome brass grid drain, chrome plated angle supplies, wheel stops, wrought escutcheons. Or reviewed equal. Provide Trubro lav guard insulation kit, or equal.

4. Provide concealed arms carrier as specified under Drainage Specialties.

B. SK-1 Sink, Single Bowl, Counter Mounted, Handwash - ADA

1. Elkay LRAD-1720-65-2 single bowl stainless steel sink, 6.5” deep bowl, 18 gauge, type 302 SS, self-rim, satin finish, sound guard undercoating, two hole drilling, rear drain. Or reviewed equal. LK35 Strainer.

2. Moen 8279MF12 4" centerset wrist blade handle gooseneck faucet, 1.2 GPM laminar flow, cast brass, 5-1/4" spout reach. Or reviewed equal.

3. McGuire ProWrap insulated 1-1/2” P-trap with supply covers, chrome plated angle supplies, wheel stops, wrought (not bell) escutcheons. Or reviewed equal.

C. SK-2 Sink, Single Bowl, Counter Mounted, Lab Work Sink

1. Elkay LRAD-2522-65-4 single bowl stainless steel sink, 6-1/2” bowl, 18 gauge, type 302 SS, self-rim, satin finish, sound guard undercoating, 4 hole drilling (three holes for faucet and one for eye wash below, rear drain. LK35 Standard Strainer. Or reviewed equal.

2. Moen M-dura 8225SM 8" centerset wrist blade handle gooseneck faucet, 2.0 GPM laminar flow, cast brass, 8" spout reach. Or reviewed equal.

3. PVC slip joint 1-1/2” P-trap, chrome plated angle supplies, wheel stops, wrought escutcheons. Or reviewed equal.

4. Provide Trubro handicapped insulation kit if leg space is not protected by a wooden panel.

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5. Guardian Equipment model G1849L Eye wash, deck mounted, swing down. Or reviewed equal.

6. Guardian equip model G3600 Tempering Valve, 6 gpm of 85 deg water. Or reviewed equal.

B. SK-3 Sink, Single Bowl, Counter Mounted, Handwash - ADA

1. Elkay LRAD-1716-65-2 single bowl stainless steel sink, 6.5" deep bowl, 18 gauge, type 302 SS, self-rim, satin finish, sound guard undercoating, two hole drilling, rear drain. Or reviewed equal. LK35 Strainer.

2. Moen 8279MF12 4" centerset wrist blade handle gooseneck faucet, 1.2 GPM laminar flow, cast brass, 5-1/4" spout reach. Or reviewed equal.

3. McGuire ProWrap insulated 1-1/2" P-trap with supply covers, chrome plated angle supplies, wheel stops, wrought (not bell) escutcheons. Or reviewed equal.

2.11 EQUIPMENT OR PLUMBING FIXTURES THAT ARE PROVIDED, BUT NOT THIS SECTION

Any equipment and/or fixtures that are provided by the Owner, or contracted by the Owner, or provided by the G.C. or by any Sections in the Contract Documents that require plumbing support will be provided such. This contractor will connect gas, compressed air, vacuum, domestic hot water, waste and vent as required.

2.12 PLUMBING SPECIALTIES, DRAINAGE

A. Carriers

1. Wall hung fixtures including water closets, lavatories, lav-decks and drinking fountains shall be supported with adjustable floor mounted carriers to fit building conditions, piping system, and fixtures specified. Each carrier shall be provided with a wall finishing frame. All carriers shall be secured to the floor with tie down lugs.

2. Carriers shall be as manufactured by Zurn or reviewed equal.

B. Traps

1. Traps of material and design as approved by the State and shall be furnished and installed at all fixtures and appliances. Trap each fixture separately, keeping all trap screws below water line; vent each trap. Make offsets in vent piping with 45-degree angle fittings when possible. Pitch horizontal vents toward waste lines, group vents and take through roof as shown. All traps, at fixtures and appliances shall be provided with accessible clean outs.

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C. Cleanouts

Provide cleanouts for soil and waste where shown on the drawings and as required by code.

2.13 PLUMBING SPECIALTIES, WATER

A. Shock Absorbers (SA)

Shock protection shall be provided where shown on drawings, at each flushwalve, and at all quick closing devices. Devices shall be stainless steel shell, welded expansion bellows surrounded by on-toxic mineral oil or gas, pressurized compression chamber charged and factory sealed, all, in-line design, threaded nipple and PDI reviewed. Sized to meet the conditions.

1. Type “1”, 'A' P.D.I. units

Zurn Z-1700, #100. Or reviewed equal.

2.14 VALVE BOXES, ACCESS DOORS AND PANELS

A. Furnish General Contractor with valve boxes, access doors/ panels for all locations where service access is required behind walls, above sheetrock and masonry ceilings, and below floors for equipment, piping, valves, and specialties furnished under Division 15.

B. Shall be located in closets, storage rooms and/or other non-public areas whenever possible, in a workmanlike manner, positioned so that junction can be easily reached and the size shall be sufficient for this purpose. When required in corridors, lobbies or other habitable areas, they shall be located as directed by the Architect.

C. Units shall have 16-gauge steel frame and 14-gauge steel hinged door panel. Door shall have concealed spring hinges allowing door to be opened to 175°.

D. Units shall be factory primed for field painting by Section 09900.

E. Provide UL-rated 1-1/2 hour Class B access panels where required to comply with applicable Code requirements.

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PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that plumbing may be installed in strict accordance with all pertinent codes and regulations and the reviewed Shop Drawings.

B. Discrepancies

1. In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

3.02 COORDINATION WITH OTHER TRADES

A. Before installation, participate in a coordination meeting with the Clerk of the Works, Construction Manager, Mechanical/HVAC, Fire Protection and Electrical trades. Establish and resolve areas of conflict and congestion, especially those indicated on the drawings. Priority to be given to HVAC equipment and large ductwork, then gravity piping, then small ductwork, then piping based on descending order of size. Special consideration given to allow access to valves, dampers etc.

B. Failure to coordinate will result in this contractor removing and relocating his piping at no additional expense to the owner.

3.03 INSTALLATION OF PIPING AND EQUIPMENT

A. General

1. Install all piping promptly, making pipe generally level and plumb, free from traps, and in a manner to conserve space for other work.

2. Provide uniform pitch of at least ¼ inch per foot for all horizontal waste and soil piping 3” or less. For piping 4” and above, slope at 1/8” minimum per foot

3. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions; promptly remove all defective material from the jobs site.

4. Install pipes to clear all beams and obstructions. Do not cut into or reduce the size of load carrying members without the approval of the Architect.

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5. Allow room between all piping and other obstructions to allow for the installation of the specified pipe insulation.

6. Plumbing vents

   a. Back vent all plumbing fixtures.
   b. Pitch all vents at 1/64" per foot minimum toward waste lines for proper drainage to prevent unintended traps.
   c. Install vent piping with each bend 45 degrees minimum from the horizontal, wherever structural conditions will permit.
   d. Group plumbing vents and take through roof as shown.
   e. Increase vents 3" and smaller one size before going thru roof. Make size transition a minimum of 12" below the surface of flat roofs and 72" (or as structure permits) below sloped roofs.
   f. Terminate 18" to 24" above roof.
   g. If installing in locations other than as shown on the drawings, line up with other plumbing vents for a neat appearance.
   h. Do not install plumbing vents within 10 feet of an operable window or door or within 25 feet of a ventilation air intake.

6. All risers and off-sets shall be substantially supported.

7. Pipe hangers shall be placed on center as follows:

MATERIAL	HORIZONTAL	VERTICAL
Copper 1-1/4" & less	6'	6'
1-1/2"	6'	10'
2" & up	10'	10'
PVC, DWV	4'	4'
Steel	10'	10'

8. Arrange all piping to maintain required grade and pitch to lines to prevent vibration. Expansion loops to anchors shall be provided where shown on drawings.

9. Make all changes in pipe size with reducing fittings.

10. All low points in water piping shall be drained with ½" gate valve with hose nipple and metal cap.

11. No piping shall be installed in such a manner to permit back-siphonage or flow of any liquid in water piping under any conditions.

12. No water piping shall be installed outside of building or in an exterior wall unless adequate provisions are made to protect such pipe from freezing.

13. All piping and drain openings left unattended will be capped, plugged or securely covered to prevent accidental entry of foreign matter. Roof drains in use will be provided with domes.

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B. Joints and Connections

1. Smoothly ream all cut pipe; cut all threads straight and true; apply best quality Teflon tape to all male pipe threads but not to inside the fittings; use graphite on all clean out plugs. DO NOT use Teflon tape on gas piping.

2. Smoothly ream all cut P.V.C. pipe. Clean and use solvent for fitting connection and in strict accordance with the manufacturer's recommendations.

3. Make all joints in copper water tube with solder applied in strict accordance with the manufacturer's recommendations.

C. Coordinate with the concrete contractor to depress the finished floor where indicated on drawings. Install floor drains at low points of surface areas to be drained. Adjust grates of drains 1/32" below finished floor, unless otherwise indicated. Finished floor shall be depressed according to the following drainage area radii:

1. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.

2. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.

3. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.

3.04 STERILIZATION AND FLUSHING OF PIPES

A. After preliminary purging of the system, chlorinate the new potable water system in accordance with the current recommendations of the American Water Works Association, and in accordance with all pertinent codes and regulations. Chlorinate only when the building is unoccupied.

B. Upon completion of the sterilization, thoroughly flush the entire potable water system.

C. After sterilization and flushing are complete, a sample shall be collected from the end of the longest main, or at any other location selected by the Architect, and a water analysis test provided. The test must prove the water acceptable or additional disinfecting of system performed. A copy of the test report shall be submitted to the Architect.

3.05 CLOSING IN UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely inspected and approved.

B. Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required and after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Architect and at no additional cost to the Owner.

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3.06 TESTING OF PIPING

Tests shall be applied to the plumbing installation as required by codes and where as directed by the Architect, and in all cases before work is covered by earth fill or pipe covering.

A. Sanitary piping shall be tested when all underground work is complete (before covering) and again, after all piping is installed, but before it is further closed in. Sanitary systems shall be securely stopped, except at the highest point, and the entire system filled with water to the point of overflow for 24 hours. All leaks shall be repaired. Cracked pipes and fitting shall be removed and replaced. No doping of soil pipe or fittings will be allowed. Plan testing around expected weather and temperature conditions or provide protection so that pipes do not freeze.

B. New domestic water piping shall be filled and subjected to a hydrostatic pressure test of 150 psi for 8 hours with no leaks. If leaks are detected they shall be repaired and the test repeated until work is tight. NOTE: Testing with compressed air only is NOT ACCEPTABLE.

3.07 CLEANING

Prior to acceptance of the buildings, thoroughly clean all exposed portions of the this installation, removing all labels and all traces of foreign substance, using only a cleaning solution approved by the manufacturer of the plumbing item, being careful to avoid all damage to finished surfaces. Additional attention may be required to thoroughly clean any used, re-used or owner provided fixtures. Clean out all strainers and aerators and adjust or replace washers, cartridges, etc.

3.08 INSTRUCTIONS

On completion of the job, this Contractor shall provide a competent technician to thoroughly instruct the Owner's Representative in the care and operation of the system. The time of instruction shall be arranged with the Owner.

3.09 RECYCLING

Discarded materials, both new and removed, shall be recycled whenever practical through metal salvage dealers (piping, etc.), paper salvage (cardboard shipping containers, etc.), wood products, etc. The Plumbing Contractor shall retain the salvage value of discarded materials and may use this value to offset his project bid price if so desired. Toxic materials such as adhesives, coolants, etc. SHALL be disposed of in a manner acceptable to the State of Maine Department of Environmental Protection.

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3.10 HAZARDOUS MATERIALS

Mercury or any other material deemed by the Federal Environmental Protection Agency or the State Department of Environmental Protection to be hazardous shall not be used in any components of the plumbing systems.

END OF SECTION

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SECTION 23 00 00

MECHANICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

General Provisions of Contract, including General and Supplementary conditions and General Requirements (if any) apply to work specified in this Section.

1.02 ALTERNATES

There are no alternates that apply to this section of the project.

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1.03 DEFINITIONS

ATC Automatic Temperature Control
EC Electrical Contractor (Division 26)
GC General Contractor
HC Heating (mechanical) Contractor (Div. 23)
PC Plumbing Contractor (Div. 22)
TAB Testing and Balancing (Div. 23)

1.04 DESCRIPTION OF WORK

A. Work Included

1. Furnish all labor, materials, equipment, transportation and perform all operations required to install a complete heating, ventilating, heat recovery and air conditioning system in the building, in accordance with these specifications and applicable drawings.

2. All temperatures are expressed in degrees Fahrenheit.

3. Perform demolition and removal as required.

4. Work to be performed shall include, but is not limited to, the following:

a. Provide and install forced air hot water heating, ventilating and air conditioning systems in building areas indicated on drawings.
b. Energy Recovery Ventilator
c. Insulation
d. Sheetmetal
e. Automatic Temperature Control (ATC)
f. Tests and balance

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5. Specifications and accompanying drawings do not indicate every detail of ductwork and equipment necessary for complete installation; but are provided to show general arrangement and extent of work to be performed. Field conditions may require adjustment of layout in some areas, in which case it is imperative to coordinate with other trades.

6. Before submitting proposal, Mechanical Contractor shall be familiar with all conditions. Failure to do so does not relieve Mechanical Contractor of responsibility regarding satisfactory installation of the system.

7. Mechanical contractor shall be responsible for rigging to hoist his own (and his sub-contractors') materials and equipment into place.

8. Mechanical contractor and his sub-contractors shall be responsible for start-up of all equipment provided under this section.

B. Related Work Described Elsewhere

1. Cutting and patching
2. Electrical conduit and wiring, except as noted below
3. Setting of sleeves in masonry work (sleeves provided by Mechanical Contractor)
4. Door louvers
5. All finish work

C. Mechanical Electrical Work

1. Provide and erect all motors, temperature controls, limit switches as specified.

2. Power supply to switches, fused switches, outlets, to line terminals of equipment, and all related wiring and fuses to properly connect and operate all electrical equipment specified shall be furnished and installed under Division 26, "ELECTRICAL". Division 26 shall not mount electrical equipment to indoor mechanical equipment without the consent of Division 23. Division 26 shall not drill wiring holes in equipment casings but shall make use of factory wiring knockouts when present. Coordinate all wiring between Mechanical and Electrical to provide a complete and operating system.

3. All wiring provided under this section shall comply with the requirements of Div. 26 and be in accordance with the latest rules and regulations of the National Fire Underwriters, National Electric code, National Fuel Gas Code, State of Maine Oil Burner Code, and Local Codes. Install all wiring under the supervision of Division 26. Any wiring that is not installed according to these standards, and which does not match wiring installed by Division 26 in type, quality and appearance shall be corrected by Division 26 at the expense of this section.

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4. Automatic Temperature Control (ATC) Systems

Power wiring (as prescribed in this section) and all control wiring shall be furnished and installed by ATC Contractor under supervision of Division 26. Any wiring that is not installed according to these standards, and which does not match wiring installed by Division 26 in type, quality and appearance shall be corrected by Division 26 at the expense of this section.

Division 26 shall provide not less than one (1) 15 amp dedicated circuit for control power. Wire each circuit to junction boxes in close proximity to the panel(s) clearly identified as "Control Power Only". ATC Contractor shall obtain control power from these circuits only.

Low voltage control wiring must be plenum rated and adequately supported with no sags or "droops". Low voltage wiring need not be installed in conduit unless required by local code.

5. Energy Recovery Ventilator

Division 26 shall provide a service disconnect and wire to line terminals in unit junction box. Division 26 shall also wire power to motorized dampers associated with ERV unit.

1.05 PERMITS

A. This Contractor shall be responsible for providing and filing all Plans, Specifications and other documents, pay all requisite fees and secure all permits, inspections and approvals necessary for the legal installation and operation of the systems and/or equipment furnished under this Section of the Specifications.

B. The Contractor shall frame under glass/ clear plastic all permits, secured by him, adjacent to the respective system and/or equipment and required to be displayed by Code, law or ordinance. Those permits secured but not required to be displayed shall be laminated in plastic and included in the Owner's maintenance manual.

1.06 CODES, ORDINANCES AND PERMITS

A. All work performed under this Section of the Specifications shall be done in accordance with applicable National, State and local Codes, Laws and Ordinances. The following abbreviations are used for reference to standards which are to be followed:

AABC	Associated Air Balance Council
ADA	Americans With Disabilities Act
AMCA	Air Movement & Control Association
ANSI	American National Standards Institute
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers

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ASTM	American Society for Testing and Materials
BOCA	Building Officials and Code Administrators
NEC	National Electrical Code
NFPA	National Fire Protection Association
NEMA	National Electrical Manufacturer's Association
OSHA	Occupational Safety and Health Act
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UL	Underwriter's Laboratories

B. The latest issue of each Code in effect at the time of bidding shall be used. Code requirements are the minimum quality and/or performance acceptable. Where the Specifications and/or Drawings indicate more stringent requirements, these requirements shall govern.

1.07 QUALITY ASSURANCE

A. Mechanical Contractor shall have prior experience with at least two projects of this nature, size and scope and be capable of producing references indicating as such.

B. Use sufficient qualified workpersons and competent supervisors in execution of this portion of the work to ensure proper and adequate installation of systems throughout. Technical training and certification of workpersons installing the systems specified, by the systems manufacturer, shall be mandatory prior to commencement of work. Documentation of such certification shall be made available to the Architect upon request within 5 business days.

C. Work performed shall conform with all Local and State Rules and Regulations, as well as those of the International Building Code and National Fire Protection Association (N.F.P.A.).

1.08 PLANS AND SPECIFICATIONS

Mechanical Contractor shall provide his sub-contractors with a copy of the entire portion of Part 1 of this specification, portions of this specification and copies of drawings which pertain to the equipment to be supplied at no cost to the sub-contractor. Provide ATC Contractor with entire set of Electrical plans and specifications. Provide Testing and Balancing sub-contractor with copies of shop drawings indicating coil GPM's, air handling unit air volumes, etc. Failure to do so may result in the Architect providing the required materials at the Contractor's expense.

Sketches pertaining to changes and amendments during construction (ASI's, RFI's and RFP's for example) shall be contract form documents issued by the Architect and/or Engineer for use during construction and it shall be the Architect's and/or Engineer's discretion to provide sketches or full size drawings. Requests for documentation other than what is provided (full size revised drawings for instance) and deemed suitable for the particular situation shall be paid for by the contractor making the request. The cost(s) shall include, but not limited to, drafting time and reproduction costs.

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1.09 ELECTRONIC DRAWINGS AND FILE SHARING

Plans and specifications may be made available in electronic format on request. Plans may be provided in either Adobe (.pdf) or CAD (.dwg or .dxf) formats and will be compressed using WinZip (.zip format). Recipient is responsible to obtain the necessary software to open the files. Note: CAD (.dwg and .dxf) files will be made available to successful bidders only after a contract is awarded.

CAD drawings are produced with AutoCAD and will be provided in the 2010 file format. Upon request for CAD files a release form will be provided which must be signed and returned to the Architect prior to transmission of electronic files. Physical mailing address, telephone numbers and e-mail address for this office are indicated on each drawing. A signed release will not be required for Adobe based files. E-mail requests may be made at rob@mechanicalsystemseng.com

1.10 MATERIALS AND SUBSTITUTIONS

All materials and equipment shall be new and of the latest design of respective manufacturers. All materials and equipment of the same classification shall be the product of the same manufacturer, unless specified otherwise.

A. Any proposal for substitution of Mechanical equipment, materials or vendors not mentioned in this specification shall be made in writing via letter or e-mail to the Architect and/or Engineer up to four working days prior to opening of bids to permit sufficient time to notify all bidders via addenda. Any requests made after the final addenda prior to bid opening will not be considered. Contractor must certify within his submittals that any equipment or materials requested to be considered as an "approved equal" meets or exceeds the requirements of this specification in all aspects and will physically fit within the space provided while providing adequate clearances for servicing of equipment as required by the manufacturers and will not interfere with other trades. Architect will not be responsible to provide drawings for substituted materials unless the substitution is agreed upon prior to opening of bids.

B. The phrase "or approved equal" shall be defined to mean the Architect shall make final determination whether or not substitute materials are an equal to that which is specified. Materials and equipment determined as an “approved equal” and/or substitutions must meet the same construction standards, capacities, code compliances, etc. as the equipment (i.e. Manufacturer, model, etc.) specified.

C. Approval by Architect for such substitution shall not relieve Mechanical Contractor from responsibility for a satisfactory installation and shall not affect his guarantee covering all parts of work Architect's decision on acceptability of substitute materials shall be final. Architect's decision on acceptability of substitute materials shall be final.

D. All materials not specified otherwise shall be manufactured within the United States and supplied locally (within the State of Maine) when available. It is preferable to obtain materials that are manufactured within 500 miles of the work site when practical.

E. Costs associated with substitutions not previously approved and circulated by addenda prior to bidding shall be borne by the Div. 23 contractor. Those costs shall include, but

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not be limited to, electrical, structural, piping, insulation, cutting and patching, etc.

F. It shall be the responsibility of the General Contractor to ensure all affected sub-contractors are provided with information specific to their trades regarding substitutions for coordination and pricing (where applicable).

1.11 SHOP DRAWINGS & SUBMITTALS

A. As soon as possible after award of contract (*but not longer than 21 calendar days*), before any material or equipment is purchased, Mechanical Contractor shall submit shop drawings for review. Unless prior arrangements are made with the Architect all shop drawings must be submitted to the General Contractor who in turn will forward them to the Architect. The quantity of copies shall be as outlined in Division 01. If shop drawings are rejected or returned for re-submittal, Mechanical Contractor shall provide said re-submittals within 14 calendar days of receipt of original submittals with review comments. If original or re-submitted shop drawings are not submitted within the allotted time frames indicated all substitutions included in the late shop drawings will, at the Architect's discretion, be invalid and the equipment primarily specified must be provided. Any costs resulting from delays in the project schedule due to failure to submit shop drawings related to this section in a timely manner shall be the responsibility of the Mechanical Contractor. Mechanical Contractor's and vendor's name, address, telephone number and e-mail addresses shall be provided with every shop drawing submission. Capacities indicated are minimums. Equipment submitted with capacities below specified parameters will be refused.

B. Shop drawings shall be properly identified and shall describe in detail the material and equipment to be provided, including all dimensional data, performance data clearly indicated, fan curves, computer selection print-outs, etc. Capacities indicated are minimums. Equipment submitted with capacities below specified parameters will be refused.

C. Corrections or comments made on the shop drawings do not relieve the contractor from compliance with requirements of the drawings and specifications. Shop drawing review is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades and performing his work in a safe and satisfactory manner.

D. Should any materials or products be purchased and/or installed without prior review and comment the contractor shall be required to remove or replace those products and/or materials, if directed by the Architect, at his expense. If the materials are not removed (or replaced) or if the project is delayed as a result of the contractor's actions, the Architect reserves the right to order the withholding of payment until the situation is resolved in a manner satisfactory to the Architect.

E. Shop drawings for Divisions 21, 22 and 23 shall be submitted under separate cover or they will be refused for re-submittal. Submittals shall be identified by job title, specification section and paragraph number. Items under each paragraph may be combined into one submittal but do not combine items from multiple paragraphs. For instance, do not

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combine items specified under par 2.01 with items specified under par. 2.02.

F. Shop drawings are required to be submitted electronically (paper copies will not be accepted). Resolution on files in .pdf format shall be a minimum of 300 dpi and a maximum of 600 dpi. Electronic files must be accessible and in an open format, meaning files must not be locked and comments may be added without altering the original content, or have interactive fields intended specifically for commenting. Locked files will not be reviewed. Exception: Color samples, where required, must be provided to the Architect in the form of original paper copies. Electronic color samples are not acceptable due to differences in monitor color rendition. Faxed copies of color samples will be refused.

G. Review must be obtained on the following items:

1. Ductwork and Accessories

   a. Registers, diffusers, and grilles
   b. Duct access doors
   c. Volume control dampers (manual and automatic)
   d. Duct sealant
   e. Turning vanes
   f. Side takeoff fittings
   g. Flexible duct
   h. Manual dampers
   i. Louvers - provide **original** color chips (photocopies and electronic copies are not acceptable)
   j. Filters

2. New mechanical equipment (sound data must be provided with all interior motorized equipment).

   a. Full warrantee information must be included with all submittals.
   b. Air conditioning Unit and accessories
   c. Energy Recovery Ventilator and accessories - provide computer selection printouts.
   d. Equipment identification tags

3. Terminal Unit

   a. Electric heating Unit.

4. Insulation

   a. Duct
   b. Equipment
   c. Pipe
   d. Pipe fittings
   e. Smoke pipe, air separator and storage water heater

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6. Qualifications and Certifications

   a. Certification(s) of Testing and Balancing Contractor
   b. Certification(s) of personnel to be installing and commissioning VRF heating and cooling systems.

7. Automatic Temperature Control (ATC) System

1.12 PRODUCT HANDLING

A. Protection

Use all means necessary to protect heating, ventilating and air conditioning materials before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacements

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

1.13 AS-BUILT DRAWINGS

Keep in good condition at the job, apart from all other prints used in actual construction, one complete set of all drawings furnished for this job. On this special set of drawings, record *completely and accurately* all differences between the work as actually installed and the design as shown on the drawings. These record drawings must be kept up to date by recording all changes within one week of the time that the changes are authorized. At the completion of the work, this set of drawings shall be delivered to the Architect for the Owner electronically in the form of CAD drawings or .pdf format with markups in red. If a complete record of changes is not made and electronic drawings not provided by the Mechanical Contractor, a record shall be made by the Architect, and the cost of the record shall be the responsibility of the Mechanical Contractor. Copies of the mechanical CAD drawings (minus professional licensing seals) may be made available at no cost to the Mechanical Contractor of record if desired. Drawings shall be dated accordingly and clearly identified as "AS-BUILT". See par. 1.09, "ELECTRONIC DRAWINGS AND FILE SHARING" for additional information.

1.14 MAINTENANCE MANUAL

A. On completion of this portion of the work, and as a condition of its acceptance, submit for approval two copies of a manual describing the system. Mechanical equipment manuals <u>shall be separate</u> from plumbing manuals. All manuals <u>shall be original copies</u>, not photocopies or they will be refused for re-submittal. Prepare manuals in durable 3-ring binders approximately 8½ inches by 11 inches in size with at least the following:

   1. Identification on the front cover and spine stating general nature of the manual.
   2. Neatly typewritten index.
   3. Complete instructions regarding operation and maintenance of all equipment

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involved.

4. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name, address and telephone number of nearest vendor of parts.
5. Copy of all guarantees and warranties issued.
6. Where contents of manuals including manufacturer's catalog pages, clearly indicate the precise item included in this installation and delete, or otherwise clearly indicate, all manufacturers' data with which this installation is not concerned.
7. Copies of signed documentation of factory startup signed by an authorized factory technicians for pumps and boilers.

B. In addition to above, provide two (2) separate offset style binders properly identified, each containing a copy of all reviewed shop drawings and catalog cuts. These may be incorporated in Maintenance Manuals, if binders are of adequate size. Also, include (2) CD's with all electronic shop drawings and catalog cuts.

1.15 OBJECTIONABLE NOISE AND VIBRATION

Mechanical equipment shall operate without objectionable noise and vibration. Should objectionable noise or vibration be transmitted to any occupied part of the building by apparatus, piping or ducts, as determined by the Architect, the necessary changes eliminating the noise or vibration shall be made by this Mechanical Contractor at no extra cost to the Owner.

1.16 GUARANTEE

This Contractor shall guarantee all materials and workmanship furnished by him or his sub-contractors to be free from all defects for a period of no less than one (1) year from date of final acceptance of completed system and shall make good, repair or replace any defective work which may develop within that time at his own expense and without expense to the Owner. Any additional costs required to extend manufacturer's guarantee and warranty for the period specified, shall be included in Contractor's base bid.

1.17 DEVIATIONS AND DISCREPANCIES

A. The drawings are intended to indicate only diagrammatically the extent, general character and approximate locations of mechanical work. Work indicated, but having minor details obviously omitted, shall be furnished complete to perform the functions intended without additional cost to the Owner. Follow the architectural, structural, plumbing and electrical drawings so that work under this section is properly installed and coordinated with other Sections.

B. The drawings and specifications are complimentary to each other and what is called for in one, shall be as binding as if called for by both. In the event of conflicting information on Div. 23 drawings, or between Div. 23 drawings and this specification notify the Architect immediately so a clarification may be issued by addenda.

C. Questions to the Architect and/or Engineers are encouraged, however any answers and/or advice is non-binding unless incorporated into the contract documents in the form of addenda, change order, etc. Inquiries requiring an answer prior to opening of bids should

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be made at least 4 days prior to when bids are due to allow time for a clarifying addendum to be issued.

D. Any conflicts arising from duplication of equipment specified in different portions of the specifications shall be brought to the attention of the Architect prior to submitting bids. Failure to do so does not relieve the Contractor from responsibility of providing said materials and equipment and a credit will be taken for the duplicated item(s).

E. Should unforeseen job conditions require re-arrangement of piping and/or ductwork resulting in deviation from the intent of the contract documents or potentially compromising the integrity of the mechanical systems, the Architect shall be notified immediately prior to commencement of work. Failure to do so will result in the contractor being responsible to correct any work installed that is contrary to the contract documents at his own expense.

1.18 CHANGE ORDERS

A. No change shall be made from the work, equipment, or materials under this section except as directed in writing by Architect.

B. All requests for change in contract price and scope shall be accompanied by a breakdown list of materials with unit and extended prices and labor hours with unit and extended price, plus markups that have been applied.

1.19 COORDINATION

A. Contractor shall be responsible to coordinate his work with that of other trades to adjust to field conditions prior to commencing work. It is also this contractor's responsibility to coordinate locations of his own piping and ductwork to ensure the two do not conflict. If a reasonable solution cannot be achieved without compromising the integrity of the intended design or would result in additional cost the Architect must be notified immediately prior to commencement of work. Failure to do so does not relieve the Contractor from providing and installing the systems to the satisfaction of the Architect at no additional cost.

B. Contractor shall be responsible to review job conditions and identify conflicts and/or obstructions to ductwork and piping prior to fabrication. If conflicts and/or obstructions are noted the Architect must be notified immediately prior to commencement of work. The cost of any fabrication work performed without confirmation and notification of conflicts and/or obstructions shall be the responsibility of the contractor.

1.20 REQUESTS FOR INFORMATION

Requests for Information (RFI) or other correspondences which are submitted electronically must be in an open format, meaning files must not be locked and comments may be added without altering the original content, or have interactive fields intended specifically for commenting. No software other than Microsoft Word, Microsoft Excel and Adobe Acrobat Standard shall be required to open files or make comments.

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1.21 WORKPLACE SAFETY

Mechanical contractor shall be responsible for the safety of his workpeople.

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PART 2 - PRODUCTS

2.01 ENERGY RECOVERY VENTILATOR

A. General

Provide and install air to air, self-contained, energy recovery ventilator of size and capacity shown. Unit shall be self contained with a programmable start/stop sequence for occupied/unoccupied control. Unit shall be Lossnay LGH series or approved equal.

Unit shall be factory assembled, wired and run tested. Contained within each unit shall be all factory wiring, control circuit board and blowers with motors, filters, and insulated foam air guides. Unit shall have an automatic by-pass damper system for economic operation under certain conditions. Unit shall have factory installed control board with functions for local, remote, and optional control modes.

B. Construction and Features

Cabinet shall be fabricated of galvanized steel, and covered with polyurethane foam insulation as necessary with steel mounting points securely attached

Unit shall be furnished with two (2) direct drive centrifugal blowers running simultaneously supplying and extracting air at the same rate for balanced ventilation air flow.

Blower motors shall be a directly connected to the blower wheels and have permanently lubricated bearings. Blowers and motors shall be mounted for quiet operation.

Heat exchanger element shall be constructed of specially treated cellulous fiber membrane separated by corrugated layers to allow total heat (sensible and latent) energy recovery from the exhaust air to the supply air or from the supply air to the exhaust air as determined by design conditions. Cross contamination of the exhaust and fresh air streams shall be less than 1%.

Unit shall have protective filters installed at both the supply and exhaust sides with an access cover to allow easy maintenance.

Unit shall have an automatic supply side by-pass damper to allow inbound ventilation air to by-pass the Lossnay® energy transfer core when outside weather conditions warrant. The mechanism for opening and closing the bypass damper shall be a 208V-230V synchronous electric motor through an actuator. The motor will drive a steel cable connected to an mechanical damper flap to allow fresh air to bypass the Lossnay® element. A supply and return air thermistor shall control the damper and may be interlocked with a remote controller.

Unit shall be equipped with factory installed air filters located at each intake face (both supply and exhaust sides) of the core to clean the air and prevent clogging.

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Mounting shall be as indicated in the plans and drawings. The ERV shall not require a condensate pan or receptacle nor condensate drain or piping. Mounting may be horizontal or vertical and the unit may be inverted as required by ductwork connection.

C. Quality Assurance

Unit shall be tested by a Nationally Recognized Testing Laboratory (NRTL) and shall bear the UL label.

Wiring shall be in accordance with the National Electrical Code (N.E.C.).

Unit shall be rated in accordance with Air-conditioning Refrigeration Institute's (ARI) Standard 1060 and bear the ARI Certification label.

Unit shall be manufactured in a facility registered to ISO 9001 and ISO 14001, which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

D. Installation

Installation all interconnecting control and power wiring, commissioning and testing shall be carried out by the ATC contractor in accord with all Codes and requirements.

E. Warranty

Unit shall have a manufacturer's parts and defects warranty for a period one (1) year from date of installation If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer. This warranty does not include labor. The energy transfer cores shall have an additional nine (9) year warranty against defects in material or workmanship. The total warranty period shall be ten (10) years from date of installation.

2.02 ELECTRIC HEATING UNIT

A. Furnish and install electric resistance heating equipment as shown.

B. Baseboard unit shall be commercial grade of the size and capacity scheduled. Unit shall have elements of all steel construction and be complete with relay/transformer unit for remote, wall mounted 24 volt thermostat (provided by ATC). Cover shall be no less than 18 gauge steel with baked enamel finish. Units to be wired for 208 volt, 60 hz, 1 phase power. Markel 3700 Series or approved equal.

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2.03 SHEETMETAL

A. General

The work under this section includes all the required sheetmetal and duct work, extensions for grilles, manual dampers, automatic counterbalanced (backdraft) dampers, deflectors, duct lining, setting of control dampers, grilles, registers, diffusers, flexible connections, fire dampers, and louvers, as shown on the drawings or required to make the installation complete in accordance with the intent of the drawings and specifications.

B. Ducts

1. The size of ducts marked on the drawings will be adhered to as closely as possible. The right is reserved to vary duct sizes to accommodate structural conditions during the progress of the work without additional cost to the Owners. The duct layout is schematic to indicate size and general arrangement only. All ducts shall be arranged to adjust to "field conditions". The Sheet Metal Contractor shall coordinate his work with Division 26 and other trades.

2. Medium and low pressure ducts shall be constructed of galvanized steel in accordance with the following table of duct sizes OR the latest SMACNA HVAC Duct Construction Standards for Metal and Flexible Duct unless otherwise shown on drawings.

Low pressure ducts:

Dimensions of Longest Side (inches)	Minimum Sheet Metal Gauge
Up thru 12	26
13 --> 30	24
31 --> 42	22
43 --> 60	20

3. Methods of fabrication and installation shall be in strict accordance with guidelines set forth in the latest SMACNA Guide and Data Book for Low and Medium Pressure Duct Construction unless otherwise shown on drawings. Cross break all ducts with largest dimension being 18 inches and larger. Beaded ducts are not acceptable except for ductwork less than 18 inches in either direction.

4. All dampers and deflectors shall be a minimum of #22 gauge and stiffened as required. Splitter dampers shall not be acceptable.

5. All joints in ducts shall be made air tight, and all branches and turns shall be made with long radius elbows and fittings wherever possible. Long radius elbows are defined as having a centerline radius of 1½ times the width of the duct.

If radius elbows are not possible consult the Architect prior to continuing. Upon approval to use square elbows, elbows shall be provided with single wall turning

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vanes. Square elbows with outside corners cut at 45° or rounded are not acceptable.

6. All ducts shall be installed with necessary offsets, changes in cross sections, risers, and drops which may be required. They shall be constructed with approved joints and be supported in an approved manner.

7. Unless specifically indicated not to, round ductwork may be substituted for rectangular if desired. The internal cross sectional area shall be not less then 95% of the cross sectional area of the rectangular duct it is replacing. Round ductwork shall be constructed in accordance with the latest SMACNA HVAC Duct Construction Standards for round and oval duct construction. Ductwork larger than 8 inches in diameter shall employ spiral seams. All turns in all sizes shall be made with smooth (not segmented), long radius elbows and fittings. All seams shall be type RL-5, grooved seam pipe lock or better. *Lap seams are not permissible.* Gauge thicknesses shall be as outlined in SMACNA for galvanized steel round duct gauge selections for maximum 2 inches w.g. static pressure. Ductwork shall be supported with full wrap-around band and single hanger strap as indicated in Figure 4-4 of the 1985 edition of the SMACNA HVAC Duct Construction Standards handbook.

8. Furnish and install flexible connections on existing air handling units and new ERV unit. Connections shall be made from Ventglas neoprene coated glass fabric as furnished by Ventfabrics, Inc., or approved equal.

9. Every precaution shall be taken to keep interior of duct system free from dirt and rubbish and to protect all ducts and equipment during construction. At completion, this Mechanical Contractor shall thoroughly clean all equipment to the satisfaction of the Architect.

10. Spaces between ducts and wall or floor construction shall be caulked to make smoke and water tight by this section. Sealant material shall be 3M brand fire barrier caulk CP25 or putty 303, Ciba-Geigy CS240 Firestop Sealant or approved equal.

11. Testing, Balancing and Leak Testing... See Part 3, EXECUTION

12. Requirements set forth in applicable codes (see part one) shall supersede SMACNA standards.

C. Diffusers, Grilles and Registers

1. Grilles and/or registers shall be installed at all air supply, relief, return and exhaust openings as shown. All Unit to be steel, except as noted, and provided with baked enamel finish to match color of grille or register and countersunk screw holes. Mounting screws shall be oval head type with head painted to match finish. Unless stated otherwise, the following list is based on model numbers of Titus to establish a standard of quality (if substituting, certified sound criteria shall be included with submittals indicating CFM and NC levels of each register and grille). Anemostat, Krueger, Metalaire and Price only will also be considered for review.

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a. Supply Registers: Double deflection; 300RL with opposed blade damper and ¾ inch front blade spacing; front blades set horizontal.
b. Exhaust and Return Registers: 350RL with opposed blade damper and ¾ inch blade spacing, 35° front blade angle, front blades set horizontal.

All lay-in registers and grilles shall be supported directly to building structure with no less than two (2) safety chains located at opposing corners.

2. Diffusers shall be installed at all air supply openings as shown. All units to be steel, except as noted, and provided with white baked enamel finish. The following list is based on model numbers of Titus to establish a standard of quality (if substituting, certified sound criteria shall be included with submittals indicating CFM and NC levels of each diffuser). Anemostat, Krueger, Metalaire and Price only will also be considered for review. If a lay-in style is specified, substitutes must also be lay-in or they will not be accepted.

a. Square face, 4 way discharge with circular duct connection, adjustable discharge pattern and removable core assembly. Model TMSA-AA for 24 inch x 24 inch lay-in application for suspended tile ceilings. Provide straightening grid for Unit in lay-in ceilings and combination butterfly damper and straightening grid for Unit in gypsum ceilings. Straightening grids to be factory mounted.

All lay-in diffusers shall be supported to building structure with no less than two (2) safety chains located at opposing corners.

D. Louvers

1. All louvers shall be extruded aluminum construction with interior bird screens and anodized finish in color to be selected by Architect. Provide not less than 2 *original* color chip cards with submittals for review (electronic and photocopies not acceptable). Frames and blades shall have not less than 55% minimum free area and no less than 0.081 inches thick. All louvers shall comply with Section 08400 of this specification. The following list is based on model numbers of Ruskin to establish a standard of quality; approved equal Unit by American Air Warming and Arrow are acceptable.

2. All louvers indicated to have motor operated dampers shall be combination type with front stationary blade with adjustable rear damper. Unit to be 6 inches deep with certified rating of zero water penetration at free area velocity of 900 FPM based on tests in accordance with AMCA Standard 500. Operators to be automatic with motor provided and installed by ATC Contractor. Dampers to be low leakage with edge and jamb seals and not exceed leakage of 4 CFM per square foot of face area on a 48 inch wide unit with 2 inches of differential static pressure. Unit 48 inches wide and less shall be standard blade, Model ELC6375X.

3. Frames of all louvers to be box type for mounting in masonry. Provide factory

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mounting flanges on head and side jambs with extended sill for Unit mounted in frame walls.

4. Louvers in doors shall be provided as a part of the door by the General Contractor.

E. Duct Sleeves

Provide aluminum duct sleeves through outside wall at all locations as shown on drawings.

F. Sealing of Ducts

All ductwork shall be sealed with low VOC water based duct mastic, either "MP" (Multi-Purpose), Carlisle Hardcast "Iron-grip 601", Polymer Adhesive "Airseal #11", or United Duct Seal (United McGill Corp.) water base, latex or acrylic type sealant. All transverse joints to be continuously sealed. Note that, except as noted, oil or solvent based sealants are specifically prohibited for use on this project.

An approved alternative to mastic is VentureTape 1580 Mastiktape. Material shall be a printed 2.0 mil annealed aluminum foil coated with a heavy application of mastik adhesive. Material shall be UL181B-FX listed foil tape. Material shall span joints by not less than 1 inch on each side of the joint. It is acceptable to overlap by not less than ½ inch if wider applications are necessary. Ensure ductwork is clean of debris and dust prior to applying the tape. Duct tape in any other form or material is strictly prohibited.

All plenums connected to louvers in exterior walls shall be internally lined with self adhesive ice and water shield as is used on roofing. Liner shall extend across the bottom and half-way up each side and back of the plenum. Seal all connections between louvers and ductwork with waterproof caulking.

G. Motor Operated Dampers

Motor operated control dampers mounted in ductwork shall be provided by ATC Contractor, but installed by this Contractor. Contractor shall seal dampers to ductwork to provide a completely waterproof and airtight seal between damper frames and ductwork.

H. Manual Dampers

1. See Part 3, EXECUTION for installation notes.

2. Manual dampers with smallest dimension 5 inches or less shall be shop fabricated, single 22 gauge blade, 3/8 inch rod, provided with position indicator and locking quadrant. Rods shall be keyed to prevent the handle from spinning on the rod.

3. Manual dampers with smallest dimension larger than 5 inches but smaller than 11 inches shall be single blade steel, 16 gauge construction, provided with position indicator and locking quadrant. Unit shall be Ruskin Type MD35 or approved equal.

4. Manual dampers with smallest dimension larger than 11 inches shall be opposed

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blade steel, 16 gauge construction, linkage concealed in frame, provided with position indicator and locking quadrant. Unit shall be Ruskin Type MD35 or approved equal.

5. Dampers to be installed in aluminum ductwork shall be fabricated of aluminum or isolated from ductwork with rubber grommets between the damper and the duct to prevent oxidation between dissimilar metals.

6. Provide hand quadrants with lockdown feature for all manual dampers (including bellmouth fittings), DuroDyne Model KS - Quadline or approved equal. Provide standoffs for round ducts.

I. Flexible Duct

Provide and install insulated flexible duct where shown on drawings. Ducts 20 inches in diameter and smaller shall be a double lamination of polyester encapsulating a steel wire helix forming an air-tight inner core. The core shall be wrapped in a blanket of fiberglass insulation (R 4.2) and sheathed in a rugged and durable reinforced metallized polyester jacket. Duct shall be class 1, U.L. 181 compliant and rated for not less than 2 inches w.g. positive working pressure. Duct internal diameter shall be same size as diffuser served. Atco UPC 030 or approved equal.

J. Bellmouth Fittings

Provide and install, at all duct branches to registers and diffusers, a bellmouth side takeoff fitting with manual damper. Provide standoffs for round ducts. Fittings shall be pre-manufactured with bell end shall have a 1½ inch radius and employ a self-adhesive gasket seal and be pre-drilled for attachment screws. Dampers shall be heavy duty with bearings. Provide hand quadrants with lockdown feature for all manual dampers (including bellmouth fittings), DuroDyne Model KS - Quadline or approved equal. Fittings shall be anchored to ductwork with *not less than* three (3) screws. Final diameter shall be same size as diffuser served. Unit shall be no thinner than 22 gauge, G-90 galvanized steel. Buckley Bellmouth HD-BM, HD-BMD or approved equal by Flexmaster or United Enertech.

K. Turning Vanes

Provide and install at all square duct elbows fixed single wall turning vanes. Turning vanes shall be constructed as outlined in the latest SMACNA HVAC Duct Construction Standards guidebook, Figure 2-3.

2.04 FILTERS

Provide and install new filter elements in existing air handling units. Clean interiors of units and install filters at completion of project. Filters shall be Farr 30/30, Air Guard DP-40 or approved equal; confirm dimensions and thickness with existing air handlers.

2.05 INSULATION AND CONDENSATE PROTECTION

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A. General

1. Insulation shall be provided for all new outside air intakes, supply ducts, exhaust and relief ducts and other insulation where shown on drawings.

2. All insulation products shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less per ASTM E 84, UL 723 and NFPA 255.

B. Duct and Equipment Insulation

1. Interior duct insulation shall be a ¾ pound density, all-service fiberglass duct wrap with factory applied foil faced FRK vapor barrier facing meeting the requirements of ASTM C 1136, Type II. Insulation material shall meet the requirements of NFPA 90A, NFPA 90B, ASTM C 1290 and ASTM C 553. Operating temperature range shall be from 40°F. to 250°F. Maximum "k" factor of 0.30 at 75°F. mean temperature difference. Owens Corning Type 75, Johns Manville Microlite XG or approved equal.

2. Insulate the following with 1½ inches installed thickness fiberglass duct wrap:

   a. Air handling unit supply air ducts
   b. ERV supply air ducts

3. Insulate the following ducts with 3 inches installed thickness fiberglass duct wrap:

   a. ERV unit outdoor air intake and exhaust ducts.

4. Material to carry U. L. label. All laps to be sealed and held in place with adhesive and flare staples. All lap joints to be folded under before stapling so no raw insulation will be showing. On the bottom of ducts 24 inches or wider, mechanical fasteners shall be provided approximately 12 inches O.C.

5. Do not cover damper hand quadrants with insulation. Taper the insulation down to the devices and adhere the insulation to the ductwork.

C. Installation

All insulation work shall be executed by skilled insulation workmen regularly employed in the trade.

2.06 AUTOMATIC TEMPERATURE CONTROL (ATC)

A. General

1. Furnish and install a complete system of electric/electronic temperature controls.

2. The control system shall be manufactured and installed by either of the following vendors:

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a. T.A.C.
Maine Controls
400 Presumpscot Street
Portland, Maine 04103
(207) 774-0220

b. Honeywell, Inc.
501 County Road
Westbrook, Maine 04092
(207) 775-3501

c. Johnson Controls
39 Salem Street
P.O. Box 840
Lynnfield, MA 01940
1-800-288-1028, ext. 4478

d. Siemens Building Technologies
66 Mussey Rd.
Scarborough, Me. 04074
(207) 885-4110

e. The Trane Company
30 Thomas Drive
Westbrook, Me. 04092
(207) 828-1777

f. Automatic Logic, Inc.
Wisdom Controls
6 Cummings Rd.
Scarborough, ME 04074
(207) 899-5775

3. ATC Contractor must be capable of providing, installing and servicing the control system in its entirety. Sub contracting of parts or partial sections of the ATC system is not permitted. Exception: Sub contracting of ATC wiring is permissible but the ATC contractor shall be ultimately responsible and liable for proper installation as outlined in Divisions 22 and 26 of this specification.

4. The control systems shall be provided and installed by trained control mechanics, regularly employed by the approved vendors, in installation and calibration of ATC equipment. No other vendor will be accepted.

5. Shop drawings of entire control system shall be submitted for approval before work is started.

6. Provide ATC technician to test the complete control systems sequences for specified cycles of operation with the Testing and Balancing Contractor.

7. ATC Contractor must, at the end of the warranty period, furnish the Owner with all access codes and passwords assigned to the control systems. ATC Contractor shall also instruct the Owner in the use of all digital control software and provide

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a backup copy of the final software package to the Owner on CD.

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B. Scope

Control system shall consist of all area thermostats, dampers, damper operators, relays, transformers, labor and other accessory equipment, and a complete system of wiring to fulfill intent of ATC specification. Control shall be provided for, but not limited to the following:

1. Existing air handlers
2. New ERV unit
3. New electric heat

C. Incidental Work by Others

1. The following incidental work shall be furnished by the designated contractor under the supervision of the Control Contractor.

   a. Sheet Metal Contractor shall:

      (1) Install all automatic dampers.
      (2) Provide necessary blank-off plates required to install dampers that are smaller than duct size.

   b. The General Contractor shall:

      (1) Provide all necessary cutting, patching and painting.
      (2) Provide access doors or other approved means of access through ceilings and walls for service to control equipment.

   c. Division 26 shall:

      (1) Wire power to all motor operated dampers.

D. Electric Wiring

1. All low voltage and data wiring for installation of temperature controls shall be by ATC Contractor, except as noted. Power wiring for equipment shall be by Division 26, "ELECTRICAL". See Part 1, Paragraph 1.04, sub-paragraph C, 'MECHANICAL ELECTRICAL WORK" for specific requirements. Exception: Power wiring from circuit breaker to temperature control panel(s) will be provided and installed by the ATC Contractor.

2. ATC Contractor shall be responsible for coordinating installation of his wiring conduits with Division 26, "ELECTRICAL".

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E. Submittal Brochure

The following shall be submitted for approval:

1. Control drawings with detailed wiring diagrams, including bill of material and description of operation for all systems.

2. Product data for all new control system components.

F. Instruction and Adjustment

Upon completion of the project, after the ATC systems have been commissioned and are functioning as intended, the ATC Contractor shall:

1. Adjust for use by Owner, all thermostats, new controllers, new damper operators, and relays provided under this section.

2. Prior to training, furnish two (2) copies of reviewed shop drawings and instruction manuals covering function and operation of control systems for use of the Owner's operating personnel. These shall include manuals of all controls installed and/or wired by the ATC Contractor even if they were provided by different vendors (pumps, boilers, etc.).

3. A competent technician who was involved in the actual installation of the ATC systems shall be provided to thoroughly instruct the Owner's Representative(s) in the care and operation of the ATC system. A representative of the Mechanical Contractor shall also be in attendance through all training. The total period of instruction shall not exceed one (1) hour. This instruction shall be in addition to instructions for equipment and systems not included in the ATC portion of this project. See par. 3.09, “INSTRUCTIONS”. Date and time of instruction shall be arranged with the Owner.

G. Guarantee

Control system shall be guaranteed to be free from original defects in both material and workmanship for a period of not less than one (1) year of normal use and service. This guarantee shall become effective starting the date Architect agrees Owner has begun to receive beneficial use of the system.

H. Hazardous Materials

Mercury, or any other material deemed hazardous by the Federal Environmental Protection Agency or the State of Maine Department of Environmental Protection, shall not be used in any components of the ATC system.

I. Thermostats

1. Existing air handlers: Relocate existing thermostats to locations shown on plan.

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2. Electric heat

   a. Provide and install a thermostat where shown. Thermostat shall be low voltage, digital, single temperature, with large backlit L.E.D. temperature display. Devices shall be programmable for 2 occupied and 2 unoccupied periods per day plus weekend settings.
   b. Devices shall have a battery backup for the display only.
   c. Thermostats shall not contain mercury or any other toxic material.
   d. Provide a clear, tamperproof cover.

3. Thermostats shall be mounted according to ADA requirements (http://www.access-board.gov/adaag/html/adaag.htm#4.27).

J. Dampers

1. Control dampers shall have 16 gauge galvanized frames not less than 2 inches in width with airfoil blades not less than 14 gauge galvanized steel, and shall be adequately braced to form a rigid assembly. No dampers shall have blades more than 6 inches wide. Dampers shall be painted with one coat of lacquer. Dampers shall be two position or proportioning as required by specific application, opposed blade type with linkage concealed within the frame. Oilite bronze bearings shall be provided at the ends of damper blades. ALL DAMPERS SHALL BE MOUNTED WITH BLADES ORIENTED HORIZONTALLY.

2. Damper operators shall be provided with bracket arrangement for location outside of air stream wherever possible. All damper motors shall be sufficient size to operate dampers, including slow opening and fast closing.

3. Dampers shall be provided with flexible metal edge and jamb seals and neoprene blade edge seals for tight closure. Leakage shall be certified to be no more than 2.0 CFM per square foot at 1 inch w.g. on Unit 24 inches wide and larger, 3.0 CFM per square foot at 1 inch w.g. on Unit less than 24 inches wide.

4. Control dampers furnished by the ATC Contractor shall include motor operated dampers installed in ERV exhaust and intake ducts.

5. Dampers shall be Ruskin Model CD60, Air Balance Model AC-516, Arrow Model, or approved equal.

K. Description of Operation

1. Existing air handling systems shall continue with the existing control sequences and devices.

2. ERV Control

   Unit shall have internal controls. Provide a digital, programmable switching device to control daily occupied/unoccupied run times. Locate at the unit control

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panel above the ceiling. Also provide an interlock between the ERV and the two motorized dampers. Dampers shall be fully closed when unit is off and fully open when unit is operating.

3. Electric Heat

Provide and install a low voltage thermostat as outlined in Par. I, "Thermostats". Device shall energize or de-energize the electric baseboard as needed to satisfy set heating requirement.

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PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all work is complete to the point where this installation may properly commence.

2. Verify that Mechanical systems may be installed in strict accordance with all pertinent codes and regulations and the approved shop drawings.

B. Discrepancies

1. In the event of discrepancy, immediately notify Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 INSTALLATION OF DUCTWORK AND EQUIPMENT

A. General

1. Size and general arrangements as well as methods of connecting all diffusers, registers, grilles, duct coils and equipment shall be as indicated, or to meet requirements for complete installation.

2. Construction standards and sheet metal gauges shall be as outlined in the latest edition of the SMACNA HVAC Duct Construction Standards handbook for metal and flexible ducts unless specifically indicated otherwise.

3. Do not use segmented elbows or screws to connect fittings on clothes dryer ducts. Use smooth, long radius elbows and pop rivets instead.

4. Do not use square elbows for offsets that are show utilizing radius elbows (or partial radius elbows) without permission from the Architect.

5. Manual Dampers

a. Manual dampers may be shop-fabricated on Unit 5 inches in height and less. All dampers larger than 5 inches MUST be pre-fabricated as previously outlined in this specification.
b. All manual dampers located within 10 feet of a fan outlet shall have the blades oriented perpendicular to the fan shaft.
c. Provide duct access door as large as possible up to 12 inches x 12 inches at each manual damper larger than 5 inches.
d. Dampers are specified to be provided with locking hand quadrants. Do not cover the devices with insulation. Taper the insulation down to the

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devices and adhere the insulation to the ductwork.

B. Protection and Cleaning

1. All open ends of ductwork which is to be unattended for 4 hours or more shall be temporarily protected with plastic sheeting and duct tape (or similar method) to reduce the collection of construction dust and debris.

2. Prior to testing and balancing and at the end of the construction, clean the interiors of all supply and return air ductwork before changing filters in air handling equipment. Careful coordination must be maintained between the time of testing and balancing and final delivery to avoid re-accumulation of dust and debris within the duct systems which will require additional cleaning by the Mechanical Contractor.

3.03 TESTING, ADJUSTING AND BALANCING (TAB)

A. General

1. TAB contractor shall be a subcontractor to the Mechanical Contractor.

2. The TAB Contractor must provide, for review, contact information and copies of qualifications and certifications through the shop drawing review process. The following is a list of acceptable TAB contractors.

   a. Central Air Balance
   b. Maine Air Balance
   c. Tab-Tech International
   d. Tekon-Technical Consultants
   e. Yankee Balancing

   No others will be accepted unless pre-approved prior to opening of bids.

3. TAB contractor shall perform functional performance test of all Division 23 equipment and entire ATC system for specified operation and control sequences.

4. The mechanical contractor shall startup all Division 23 equipment as required by the equipment specifications. Mechanical contractor shall verify that systems are complete and operable before TAB commencing work. Ensure the following conditions:

   a. Systems are started and operating in a safe and normal condition.
   b. Temperature control systems are installed complete and operable.
   c. Proper thermal overload protection is in place for electrical equipment.
   d. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   e. Duct systems are clean of debris.
   f. Fans are rotating correctly.
   g. Volume dampers are in place and open.
   h. Air coil fins are cleaned and combed.

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i. Access doors are closed and duct end caps are in place.
j. Air outlets are installed and connected.
k. Duct system leakage is minimized.

5. TAB Contractor shall submit field reports to General Contractor. Report defects and deficiencies noted during performance of services which prevent system testing and balance.

6. TAB contractor shall submit all verification and functional performance checklists/results, signed by indicated personnel, organized by system and sub-system.

7. TAB contractor shall submit other reports described below.

B. Work Included

1. Test, adjust and balance all air systems, including components to conform to air and water flow rates shown on drawings.

2. Complete and submit balance report. Report shall be submitted with information noted on one side of sheet only (i.e., backside of sheet shall be blank.).

3. Careful coordination must be maintained between the time of testing and balancing and final delivery to avoid re-accumulation of dust and debris within the duct systems which will require additional cleaning by the Mechanical Contractor.

C. Quality of Compliance

1. Qualification: TAB Contractor must be independent test and balancing agency.

2. AABC Compliance: Comply with AABC Manual MN-1 "AABC National Standards" as applicable to mechanical and hydronic distribution systems and/or Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).

3. Industry Standards: Comply with ASHRAE recommendations for measurements, instruments and testing and balancing.

4. Coordination: Work together with ATC Contractor to adjust set points of various devices to balance system(s) and test control sequences of operation. ATC Contractor shall be responsible for balancing return air, exhaust (relief) air and outdoor air dampers on Air Handling Unit in order to achieve proper mixed air temperatures.

5. ASHRAE Guideline 1-1996, "The HVAC Commissioning Process".

D. Execution of TAB Work

1. TAB Contractor shall visit job site and determine that control devices, test devices

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and valves are correctly installed and ready for balancing.

2. Examine each air distribution system to see that it is free from obstructions. Determine that all dampers and registers are in a set or full open position; that moving equipment is lubricated, and that required filters are clean and functioning. Request that Installing Contractor perform any adjustments necessary for proper functioning of the system.

3. TAB Contractor shall use test instruments that have been calibrated within a time period recommended by the manufacturer, and have been checked for accuracy prior to start of testing, adjusting and balancing activity.

4. Verify that all equipment performs as specified. Adjust variable type drives, volume dampers, control dampers, balancing valves and control valves as required by TAB work.

5. Test pressure profile of systems by traverse as required.

6. Adjust each register, diffuser terminal unit and damper to handle and properly distribute design airflow within 5% of specified quantities. Mark all setpoints.

7. Adjust front and rear discharge louvers on each supply register to distribute air in an even pattern or as indicated on plans.

8. Adjust air discharge patterns of all supply air diffusers, registers and grilles for optimal air diffusion.

9. Document results of all testing on approved TAB report formats and submit 3 copies for approval and record within 15 days of completion of TAB work. Include a warranty period of 90 days, during which time the Architect and/or Engineer may request a re-check or re-adjustment of any part of the work.

10. Reports shall be compiled on a spreadsheet such as Excel, Quattro-Pro, Lotus, etc. and shall clearly indicate the following *minimum* information:

    a. Air (Rated and Actual)

        1) System/unit name
        2) HP, BHP, voltage, amperage and fan rpm
        3) Static pressures; suction, discharge and total
        4) Total system flow rate
        5) Individual terminal flow rates (Terminal readings must show location, make, model and size of register, grille or diffuser).
        6) Filter status report

    b. Water

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1) None

Reports to have a minimum of color or must be compatible with monochrome printers. Reports must be submitted to the Architect electronically in addition to hard copies.

E. Drawings

Drawings in CAD format may be made available to the TAB Contractor after the contract for this work is awarded. See par. 1.09, "ELECTRONIC DRAWINGS AND FILE SHARING" for additional information.

3.07 CLOSING IN UNINSPECTED WORK & ROUTINE INSPECTIONS

A. General

Do not cover up or enclose work until it has been properly and completely inspected and approved.

B. Contractor is required to provide not less than 48 hours advance notice to the Architect of intent to cover non-inspected work to permit time for scheduling inspections.

C. Noncompliance

Should any work be covered up or enclosed prior to all required inspections and approvals, the Architect reserves the right to order the uninspected work to be uncovered for inspection at the Contractor's expense. After the work has been inspected completely and approved, make all repairs and replacements with materials necessary for approval by the Architect and at no additional cost to the Owner.

3.08 TEMPORARY HEATING

A. Mechanical Contractor shall install the new heating system and related equipment as soon as those portions of the building are ready and the work can be performed.

B. Mechanical Contractor will be required to permanently connect as many Unit as possible for temporary heat.

C. At the conclusion of the temporary heating period, the complete system shall be thoroughly cleaned.

D. General Contractor will be required to assume full responsibility for the care and operation of the new equipment during its temporary use and to return the equipment to the Mechanical Contractor in perfect order, normal wear and tear excepted.

E. Water, fuel and electric power required to operate the heating system for temporary heat shall be provided by the Owner.

3.09 CLEANING

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Prior to acceptance of the buildings, thoroughly clean all exposed portions of the Heating, Ventilating and Air Conditioning installation, including the removal all labels and all traces of foreign substance. Prior to testing and balancing vacuum and clean inside of existing air handlers and new ERV unit. Clean the interiors of ductwork as outlined in 3.04, "INSTALLATION OF DUCTWORK AND EQUIPMENT"; paragraph "B", "Protection and Cleaning".

3.10 INSTRUCTIONS

On completion of the job, the Mechanical Contractor shall provide a competent technician to thoroughly instruct the Owner's Representative in the care and operation of the system. The total period of instruction shall not exceed one (1) hour. ATC system instruction shall be in addition to this instruction period. See 2.06, "AUTOMATIC TEMPERATURE CONTROL (ATC)", sub-par F, "Instruction and Adjustment". The time of instruction shall be arranged with the Owner.

3.11 REMOVAL OF EXISTING PIPING AND EQUIPMENT

A. All piping and equipment indicated on the drawings for removal shall be done so by the Mechanical Contractor.

B. All materials removed shall remain the property of the Owner until such time the Owner has reviewed the removed materials and either taken or designated items which he may wish to retain. The remainder shall become the property of this Mechanical Contractor and be removed from the premises immediately.

C. Any damages done to removed materials prior to release by the Owner shall be corrected by the Mechanical Contractor at no additional expense to the Owner. Any materials removed prior to release by the Owner shall be replaced by the Mechanical Contractor at no additional expense to the Owner.

3.12 RECYCLING

Discarded materials, both new and removed, shall be recycled whenever practical through metal salvage dealers (ductwork, piping, etc.), paper salvage (cardboard shipping containers, etc.), wood & plastic products, etc. The Mechanical Contractor shall retain the salvage value of discarded materials and may use this value to offset his project bid price if so desired. Toxic materials such as adhesives, coolants, refrigerants, etc. SHALL be disposed of in a manner acceptable to the State of Maine Department of Environmental Protection.

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SECTION 26 00 00

GENERAL REQUIREMENTS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Definition of Work

Conditions of the Contract, Specifications, Change Orders, Addenda and Drawings apply to work of this section.

B. Provisions

As used in this section, "provide" means "furnish and install", "furnish" means "to purchase and deliver to the project site complete with every necessary appurtenance and support and to store in a secure area in accordance with manufacturers instructions", and "install" means "to unload at the delivery point at the site or retrieve from storage, move to point of installation and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project".

C. Existing Site Conditions – Responsibilities Prior to Bid

Before submitting a bid, Electrical Contractor is required to make a pre-bid site visit and carefully examine site to identify existing conditions and difficulties that may affect the work of this Section. No extra payment will be allowed for additional work caused by unfamiliarity with site conditions.

D. Existing Site Conditions – Responsibilities Prior to Starting Work

Before starting work in a particular area of the project, the Electrical Contractor shall examine the conditions under which work must be performed including preparatory work performed under other Sections of the Contract, or by the Owner and report conditions which might adversely affect the work in writing to the Engineer. Do not proceed with work until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing conditions and preparatory work.

E. Coordination of Work

The Electrical Contractor shall coordinate the work of all trades and, with all other subcontractors to determine whether there will be any interference with the electrical work. If the electrical work is later found to interfere with the work of other subcontractors, then he shall make necessary changes, without additional cost to the Owner, to eliminate such interference.

F. Discrepancies in Documents

Each bidder shall be responsible for examining the specifications carefully before submitting his bid, with particular attention to errors, omissions, conflicts with

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provisions of laws and codes imposed by authorities having jurisdiction, conflicts between portions of specifications, and ambiguous definition of the extent of coverage in the contract. Any such discrepancy discovered shall be brought to the immediate attention of the Engineer for correction. Should any of the aforementioned errors, omissions, conflicts or ambiguities exist in the specification, the Electrical Contractor shall have the same explained and adjusted in writing before signing the contract or proceeding with work. Failure to notify the Engineer in writing of such irregularities prior to signing the Contract will cause the Engineer's interpretation of the Contract Documents to be final. No additional compensation will be approved because of discrepancies thus resolved.

1.02 APPLICABLE CODES AND STANDARDS

A. Work

All work shall be in accordance with the laws, rules, codes, and regulations set forth by Local, State, and Federal authorities having jurisdiction. All products and materials shall be manufactured, installed and tested as specified, but not limited to the latest accepted edition of the following codes, standards and regulations:

NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
NEC	National Electrical Code (NFPA 70) - 2014
UL	Underwriters Laboratory
NESC	National Electrical Safety Code
FM	Factory Mutual Association
MUBEC	Maine Uniform Building and Energy Code
Local AHJ	Local and State building, electrical, fire and health department and public safety codes agencies.

B. Code Conflicts

When requirements cited in this Paragraph conflict with each other or with Contract Documents, the most stringent requirements shall govern conduct of work. The Engineer may relax this requirement when such relaxation does not violate the ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing. Should the Electrical Contractor perform any work that does not comply with the requirements of the applicable building codes, state laws, and industry standards, he shall bear all costs arising in correcting these deficiencies.

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1.03 CONTRACT DOCUMENTS

A. Work to be Provided

Work to be provided under this division is shown on the Electrical Drawings, General Requirements, and in these Contract Specifications.

B. Coordination of Work

The listing of electrical drawings does not limit the responsibility of determining the full extent of work that is required by these contract documents. The Electrical Contractor shall refer to the drawings and other specification sections included in the complete Contract Package, that indicate types of construction with which work of this section must be coordinated. The General Contractor shall coordinate the work of all trades including that of the Electrical Contractor, with all other subcontractors to determine whether there will be any interference with the electrical work. If the Electrical Contractor fails to check with the General Contractor and the electrical work is later found to interfere with the work of other subcontractors, then he shall make necessary changes, without additional cost to the Owner, to eliminate such interference.

C. Intent of Design

Drawings are diagrammatic and indicate the general arrangement of systems and work to be included in the Contract. Information and components shown on riser diagrams or called for in the specifications but not shown on plans, and vice versa, shall apply and shall be provided as though required expressly by both. The contract documents are not intended to indicate and specify each component required, but do require that the components and materials be provided for a complete and operational installation.

D. Discrepancies in Documents

Each bidder shall be responsible for examining the drawings and specifications carefully before submitting his bid, with particular attention to errors, omissions, conflicts with provisions of laws and codes imposed by authorities having jurisdiction, conflicts between portions of drawings, or between drawings and specifications, and ambiguous definition of the extent of coverage in the contract. Any such discrepancy discovered shall be brought to the immediate attention of the Engineer for correction. Should any of the aforementioned errors, omissions, conflicts or ambiguities exist in either or both the drawings and specifications, the Electrical Contractor shall have the same explained and adjusted in writing before signing the contract or proceeding with work. Failure to notify the Engineer in writing of such irregularities prior to signing the Contract will cause the Engineer's interpretation of the Contract Documents to be final. No additional compensation will be approved because of discrepancies thus resolved.

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E. Conflicts with Codes and Regulations

The drawings and these specifications are intended to comply with all the above mentioned Codes, Rules and Regulations. If discrepancies occur, the Electrical Contractor shall immediately notify the Engineer in writing of said discrepancies and apply for an interpretation and, unless and interpretation is offered in writing by the Engineer prior to the execution of the contract, the applicable rules and regulations shall be complied with as a part of the contract.

F. Efficiency Maine

This project intends to pursue Efficiency Maine (EM) prescriptive and/or custom incentives where applicable. The Electrical Contractor shall coordinate the activities associated with Efficiency Maine incentive approval process including but not limited to; preparation and submission of all applicable incentive applications, receiving pre-approval when applicable, the tracking and submission of measure specific invoices to Efficiency Maine within 60 days of the completion of the work, and follow-up as necessary until Greater Portland Health receives the incentives.

1. The Electrical Contractor shall also:

   a. Become familiar with the Efficiency Maine Business Program including available incentives and the application and review process.

   b. Review the specifications and field conditions for compliance with Efficiency Maine standards for applicable systems and technologies.

   c. Review the specifications for any and all incentive opportunities, prescriptive and custom.

2. The project schedule shall reflect and accommodate the time required to achieve application preapproval from EM. No equipment shall be purchased until preapproval is received from EM.

3. All invoices shall be forwarded to EM and the Owner within 60 days of the completion of work. This deliverable shall be shown on the project schedule as a milestone date and coordinated with all contractors to assure compliance with this requirement.

4. Efficiency Maine is available to assist in the application process and can be reached by contacting Peter Laiho, Program Delivery Engineer, at 207-242-6826. Electrical Contractor must contact EM prior to submittals to review the project equipment and scope.

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PART 2 - SCOPE OF WORK

2.01 GENERAL REQUIREMENTS

A. General Scope

The work to be accomplished under these specifications includes providing all labor, materials, equipment, consumable items, supervision, administrative tasks, tests and documentation required to install complete and fully operational electrical systems as described herein and shown on the Drawings.

B. Administrative Responsibilities

The Electrical Contractor shall file plans, obtain permits and licenses, pay fees and obtain necessary inspections and approvals from authorities that have jurisdiction, as required to perform work in accordance with all legal requirements.

2.02 WORK TO BE PROVIDED UNDER THIS DIVISION

A. General Scope

The Work shall be complete from point of service to each outlet or device with all accessory construction and materials required to make each item of equipment or system complete and ready for operation. The work shall include but not be limited to the following. The Electrical Contractor shall provide:

1. **Grounding System:** Furnish an equipment grounding conductor for each feeder and branch circuit.
2. **Power Distribution Systems:** Provide power and lighting distribution systems for the areas, including breakers in existing panelboards (if required), receptacles, raceway, cable and wire.
3. **Feeder and Branch Circuit Wiring:** Provide feeder and branch circuits and devices for power to equipment and convenience receptacles. This includes branch wiring to system control panels furnished under other sections.
4. **Motor Circuit Wiring:** Provide all motor wiring, safety disconnects, and motor starters unless integral with equipment.
5. **Interior Lighting Systems:** Provide interior lighting system and devices including normal and emergency fixtures, exit signs, lamps, controls, trim and accessories.
6. **Control Wiring:** Provide control wiring not provided by Division 23.
7. **Supports and Fittings:** Provide all support material and hardware for raceway, cable tray and electrical equipment.

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8. **Terminations:** Provide terminations of all cable and wire unless otherwise noted.

9. **Penetrations:** Provide all building wall, floor and roof penetrations for raceway and cable tray where not provided by the General Contractor.

10. **Demolition:** Demo existing receptacle or switch. Remove wiring back to panel.

11. **Other Items Furnished By Others:** Install the following equipment furnished by others:

    a. Motors

    b. Control Panels

2.03 WORK NOT INCLUDED UNDER THIS DIVISION

A. Related Work Included in Other Sections

The following work is not included in this Section and shall be performed under other sections:

1. Excavation and backfill.

2. Concrete work, including concrete housekeeping pads and other pads and blocks for vibrating and rotating equipment.

3. Cutting and patching of masonry, concrete, tile, and other parts of structure, with the exception of drilling for hangers and providing holes and openings in metal decks. The Electrical Subcontractor shall identify locations of penetrations, excavations, structural supports, etc. required for the completion of the Work of this Section to the General Contractor in a timely manner.

4. Installation of access panels in ceilings and wall construction.

5. Painting, except as specified herein.

6. Outdoor air intake or exhaust louvers.

7. Control wiring specifically indicated as part of Division 23.

2.04 GENERAL EQUIPMENT AND MATERIALS REQUIREMENTS

A. General Requirements

All equipment and materials shall be new (with the exception of those lighting fixtures designated to be reused) and of the quality specified. All materials shall be free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged during construction shall not be repaired at the jobsite, but shall be replaced with new materials. Remove from job site and properly dispose of all materials that are not being reused. NOTE: OWNER HAS THE OPTION TO KEEP ANY OF THE REMOVED MATERIAL AND EQUIPMENT.

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B. Representation of Equipment

All equipment installed on this project shall have local representation, local factory authorized service, and a local stock of repair parts.

C. Warranties

No equipment or material shall be installed in such a manner as to void a manufacturer's warranty. The Electrical Contractor shall notify the Engineer of any discrepancies between the Contract Documents and manufacturer's recommendations prior to execution of the work. Provide Owner with a one year warranty on all parts and labor. Provide the Owner with any and all standard warranties from the manufacturer.

2.05 SHOP DRAWINGS

A. General Requirements

After the Contract is awarded, but prior to proceeding with the Work, the Electrical Contractor shall obtain complete shop drawings, product data and samples from manufacturers, suppliers, vendors, and Subcontractors for all materials and equipment specified herein, and submit data and details of such materials and equipment for review by the Engineer. Submission of such items shall follow the guidelines set in the General Section of the Specification Document. Prior to submission of the shop drawings, product data, and samples to the Engineer; the Electrical Contractor shall review and certify that the shop drawings, product data, and samples are in compliance with the Contract Documents. Further, the Electrical Contractor shall check all materials and equipment after their arrival on the jobsite and verify their compliance with the Contract Documents. A minimum period of ten working days, exclusive of transmittal time will be required in the Engineer's office each time shop drawings, product data and/or samples are submitted or resubmitted for review.

B. Information to be included in Submittal

The shop drawing submittal shall include all data necessary for interpretation as well as manufacturer's name and catalog number. Sizes, capacities, colors, etc., specified on the drawings shall be specifically noted or marked on the shop drawings.

C. Information Not to be included in Submittal

Submittals shall contain only information specific to systems, equipment and materials required by Contract Documents for this Project. Do not submit catalogs that describe products, models, options or accessories, other than those required, unless irrelevant information is marked out or unless relevant information is highlighted clearly. Marks on submittals, whether by Contractor, Subcontractor, manufacturer, etc., shall not be made in red ink. Red is reserved for review process.

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D. Responsibility of Submitted Equipment

The Engineer's review of such drawings shall not relieve the Subcontractor of responsibility for deviations from the Contract, Drawings or Specifications, unless he has in writing called the attention of the Engineer to such deviations at the time of the submission. The Engineer's review shall not relieve the Contractor from responsibility for errors or omissions in such drawings.

E. Proposal of Other Equipment

If the Contractor proposes an item of equipment other than that specified or detailed on the drawings which requires any redesign of the wiring or any other part of the mechanical, electrical or architectural layout, the required changes shall be made at the expense of the trade furnishing the changed equipment at no cost to the Owner.

F. Substitution of Equipment of Equal Quality

Manufacturer's names are listed herein and on the drawings to establish a standard for quality and design. Where one manufacturer's name is mentioned, products of other manufacturers will be acceptable if, in the opinion of the Engineer the substitute material is of quality equal to or better than that of the material specified. Where two or more manufacturer's names are specified, material shall be by one of the named manufacturers only.

2.06 RECORD DRAWINGS

A. General Requirements

As work progresses, and for duration of the Contract, the Contractor shall maintain a complete and separate set of prints of Contract Drawings at job site at all times and record work completed and all changes from original Contract. Drawings shall clearly and accurately include work installed as a modification or added to the original design. At completion of work and prior to final request for payment, the Contractor shall submit a complete set of reproducible record drawings showing all systems as actually installed.

B. Operation and Maintenance Data

Provide manufacturer’s printed operating procedures to include start-up, break-in, routine and normal operation instructions; regulation control, stopping, shut-down, and emergency instructions. Provide copies of all warranties.

C. Equipment Specifications

1. New Panelboards: Panelboards shall be of the sizes, rating and arrangement shown on the attached sketch. Panelboards shall be provided complete with all overcurrent devices, accessories and trim. All panelboards shall be provided with safety barriers for dead front construction. The required short circuit ratings of assembled panelboards are shown on the Drawings. The short circuit rating of

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every overcurrent device in the panel shall meet or exceed the panel rating. Unless otherwise noted on the Drawings, series rated combinations will not be permitted.

A. Enclosures: Boxes shall be code gauge galvanized sheet steel. Trim shall be code gauge steel, ANSI-61 gray finish with stainless steel flush type lock/latch handle. All locks shall be keyed alike. Trim for surface mounted panels shall be of hinged door construction such that the gutter space may be exposed by a hinged door. Directory frames shall be metal frame with plastic covers.

B. Bus Work: All bus work shall be 1000 amp/sq. in. copper or 750 amp/sq. in. aluminum. Unless otherwise noted on the drawings, neutral busses shall be 100% rated with adequate connections for all outgoing neutral conductors. Panelboards shall be provided with copper or aluminum ground busses.

C. Circuit Breakers: Overcurrent devices shall be trip-free molded case, bolt-on, thermal magnetic circuit breakers. Main circuit breakers shall be individually mounted and bolted to bus assembly. Back-fed branch mounted circuit breakers are prohibited. Front faces of all circuit breakers shall be flush. Trip indication shall be clearly shown by the handle position between the ON and OFF positions. All connections shall be rated for 75ºC copper conductors.

2. Existing Panelboards: When reusing existing panelboards, provide additional breakers as shown on the plans.

A. Circuit Breakers: Overcurrent devices shall be trip-free molded case, bolt-on, thermal magnetic circuit breakers. Front faces of all circuit breakers shall be flush. Trip indication shall be clearly shown by the handle position between the ON and OFF positions. All connections shall be rated for 75ºC copper conductors.

3. Grounding System

a. A green equipment grounding conductor shall be run with each branch circuit.

4. Feeder and Branch Circuit Wiring:

a. Provide feeder and branch circuits and devices for power to equipment and convenience receptacles. This includes branch wiring to system control panels furnished under other sections.

b. All wiring shall be copper, minimum size #12 AWG. Conductors shall be 600V rated with THHN, THWN or XHHW insulation. A green equipment grounding conductor shall be run with each branch circuit.

c. All exposed wiring shall be in EMT conduit. Wiring above acoustic ceiling tiles and in walls shall be part of an MC cable assembly.

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d. All conduits or penetrations in fire rated walls shall be furnished with fire stopping material to maintain the integrity of the rating.

e. All conduits penetrating the roof or exterior walls shall be furnished with watertight seals.

5. Motor Circuit Wiring: Provide all motor wiring, safety disconnects, and motor starters unless integral with equipment.

a. Manual motor starters: Shall be Single phase fractional HP manual motor starters shall be toggle operated, enclosed, one or two pole switches as required by the installation. The enclosure shall be NEMA 1 for indoor locations and NEMA 4 for outdoor, wet and damp locations. A handle guard shall be provided to allow the toggle operator to be padlocked in the OFF position. Starters shall be provided with trip free melting alloy thermal overloads.

D. Lighting Systems:

1. Light fixtures shall be provided with housings, trims, ballasts, lamps, lamp holders, sockets, reflectors, wiring and other components required, as a factory-assembled unit for a complete installation. Provide electrical wiring within light fixtures suitable for connecting to branch circuit wiring in accordance with N.E.C. Article 410, Paragraph 25. Provide lighting fixtures of sizes, types and ratings indicated and specified in the Lighting Fixture Schedule on the Contract Drawings.

2. Contractor shall communicate with and provide all rebate worksheets and corresponding equipment cut sheets to Efficiency Maine for approval prior to ordering the fixtures to ensure that the Owner can receive the full value of the rebate for providing high efficiency fixtures.

3. Occupancy Sensors: Occupancy sensors of the type and model specified on the drawings shall be provided, installed and wired into the local lighting circuit in the area that the sensors are installed. The engineer will consider equipment of another equal manufacturer, where suitable coverage can be documented.

a. Passive Infrared Wall-Mount Sensors: Wall mounted occupancy sensors shall be suitable for dual circuit operation as specified on the contract drawings.

b. Ultrasonic/Infrared Ceiling-Mounted Sensors: Ceiling mounted occupancy sensors shall be self-calibrating type as specified on the contract drawings.

c. Power Packs: Power packs shall be provided as required for each room provided with occupancy sensors as needed.

d. Slave Relay Packs: Slave relay packs shall be provided in rooms with more than one lighting circuit controlled by the occupancy sensor.

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e. Installation Requirements: Provide all miscellaneous equipment and wiring for a complete installation.

E. Fire Alarm Systems:

3 In this electrical scope, new Fire Alarm devices shall be placed as shown on the Electrical Plans. Candela ratings of strobes shall be sized as per NFPA 72 requirements.

4 Coordinate all fire alarm system devices and wiring with the Owner or the Owner's Representative. All fire alarm work shall be coordinated with the Owner's Fire Alarm Vendor, Protection One, Contact: 1-800-341-0107. All existing devices shown shall be compliant for use with the existing Fire Alarm Control Panel. The Electrical Contractor shall also be responsible for coordinating all work with the Authority Having Jurisdiction (AHJ) and providing all equipment and devices that may be required for Fire Department/AHJ Approval, whether shown on the plans or not.

PART 3 – EXECUTION

3.01 WIRING METHODS

A. General

Perform work by qualified journeymen if their respective trades who are employed by a firm that can demonstrate successful experience with work similar in type, quality and extent to the work required by this project.

B. Requirements

Unless otherwise noted all wiring shall be installed in raceway as follows:

1. **Power Distribution Indoors:** Unless otherwise noted, all other power distribution wiring including feeders and branch circuits shall be installed in electrical metallic tubing (EMT) when exposed and MC Cable when concealed. Hospital grade wiring for new exam rooms shall be in HCF Type MC cable assemblies as manufactured by Southwire or approved equal, and installed in accordance with National Electrical Code 517.13(A) and 517.13(B).

2. **Fire Alarm Wiring:** Shall be installed in EMT where exposed and MC cable where concealed.

3.02 EQUIPMENT ARRANGEMENT AND ACCESS

A. Location of Equipment

Locate all equipment which must be serviced, operated or maintained in fully accessible positions. Minor deviations from the drawings may be made to allow for

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better accessibility at no additional cost to the Owner, but changes shall not be made without review by the Engineer. Minimum clearances in front of or around equipment shall conform to the latest applicable code requirements.

3.03 EQUIPMENT LABELING

A. Starters and Disconnect Switches

All starters, disconnect switches and other specified equipment shall be marked with engraved laminated plastic plates, minimum 1/2" high with 1/4" engraved letters. Where individual switches or circuit breakers in power or distribution panelboards do not have cardholders, they shall be marked with 1/2" high labels.

B. Empty Conduits

All empty conduits shall have labels tied to the pull string at each end of each empty conduit, marked as to identification of each end. Junction boxes with circuits provided for future use shall be labeled with appropriate circuit designation.

C. Panelboard Directories

Cardholders for panelboards shall be filled out with typewritten identification of each circuit, except that the word "spare" shall be written in soft pencil to identify all circuit breakers installed that are not used.

3.04 TEMPORARY LIGHT AND POWER

A. Requirements

The intent is to use the existing power and lighting in the area for temporary light and power. All such temporary electrical work shall meet the requirements of OSHA. The General Contractor and all subcontractors, individually, shall furnish all extension cords, portable lights and lamps as required for their work.

B. Reimbursable Items

The General Contractor and all subcontractors shall reimburse the Electrical Subcontractor for any temporary wiring of a special nature, other than that specified above, required for their work.

C. Removal of Equipment and Wiring

All temporary wiring, service equipment, and accessories thereto shall be removed by the Electrical Subcontractor when directed by the General Contractor.

END OF SECTION