

Glynn Johnson Door Controls Rockwood

Manual	HM	FB6	780	555
	WD	FB6W	790	557
Self Latching	HM	FB51P	845	1845
	WD	FB61P	945	1945
Automatic	HM	FB31P	842	1842
	WD	FB41P	942	1942

1. Dust Proof Strikes shall be furnished at all floor locations.

2.6 CYLINDERS AND KEYING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Cylinders: Same manufacturer as for locks and latches.
- B. Standards: Comply with the following:
 1. Cylinders: BHMA A156.5.
- C. Cylinder Grade: BHMA Grade 1.
- D. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 1. Number of Pins: Six.
 2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
- E. Construction Keying: Comply with the following:
 1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- F. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
 1. Existing System: Master key or grand master key locks to Owner's existing system.
 2. Keyed Alike: Key all cylinders to the same change key.
 - a. Cylinders shall be master keyed.
- G. Keys: Provide nickel-silver keys complying with the following:
 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
 2. Quantity: In addition to one extra blank key for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.

2.7 STRIKES

- A. Standards: Comply with the following:

1. Strikes for Bored Locks and Latches: BHMA A156.2.
 2. Strikes for Mortise Locks and Latches: BHMA A156.13.
 3. Dustproof Strikes: BHMA A156.16.
- B. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
- C. Dustproof Strikes: BHMA Grade 1.

2.8 ACCESSORIES FOR PAIRS OF DOORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Coordinators:
 - a. Adams Rite Manufacturing Co. (ARM).
 - b. Door Controls International (DCI).
 - c. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - d. Ives; H. B. Ives (IVS).
 - e. Rockwood Manufacturing Company (RM).
- B. Standards: Comply with the following:
1. Coordinators: BHMA A156.3.

2.9 CLOSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Surface-Mounted Closers:
 - a. LCN Closers; an Ingersoll-Rand Company (LCN).
 - b. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
- B. Standards: Comply with the following:
1. Closers: BHMA A156.4.
- C. Surface Closers: BHMA Grade 1.
- D. Certified Products: Provide door closers listed in BHMA's "Directory of Certified Door Closers."
- E. Size of Units: Unless otherwise indicated, provide the following. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
1. LCN:
 - a. Exterior: 4140 Series
 - b. Interior: 4010 Series
 2. Sargent:

- a. Exterior: 281
- b. Interior: 281

2.10 PROTECTIVE TRIM UNITS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Metal Protective Trim Units:
 - a. Burns Manufacturing Incorporated (BM).
 - b. Hager Companies (HAG).
 - c. Ives: H. B. Ives (IVS).
 - d. Rockwood Manufacturing Company (RM).
- B. Standard: Comply with BHMA A156.6.
- C. Materials: Fabricate protection plates from the following:
 - 1. Stainless Steel: 0.050 inch (1.3 mm) thick; beveled top and 2 sides.
- D. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.
- E. Fabricate protection plates as follows:
 - 1. Push Plates: 16" high by 8" wide.
 - 2. Kick Plates: 10" high by 1-1/2" less than door width for single doors and 1" less than door width for pairs of doors. Kick plates shall be applied to push side of all doors where noted.

2.11 STOPS AND HOLDERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Stops and Bumpers:
 - a. Burns Manufacturing Incorporated (BM).
 - b. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - c. Hager Companies (HAG).
 - d. Ives: H. B. Ives (IVS).
 - e. Rockwood Manufacturing Company (RM).
 - 2. Electromagnetic Door Holders:
 - a. Rixson-Firemark
 - b. Norton Door Controls
 - c. Sargent
- B. Standards: Comply with the following:
 - 1. Stops and Bumpers: BHMA A156.16.
 - 2. Mechanical Door Holders: BHMA A156.16.
 - 3. Electromagnetic Door Holders: BHMA A156.15.
 - 4. Combination Overhead Holders and Stops: BHMA A156.8.
 - 5. Door Silencers: BHMA A156.16.
- C. Wall Stops: BHMA Grade 1. Wall type bumpers with concealed type flange shall be used where ever possible and shall be one of the following:

1. Ives - 407 1/2
 2. Door Controls - 3211T
 3. Rockwood - 409
- D. Electromagnetic Door Holders for Labeled Fire Door Assemblies: Coordinate with fire detectors and interface with fire alarm system.
1. Rixson-Firemark: 990 Series
 2. Norton Door Controls: 6900 Series
 3. Sargent: 1500 Series
- E. Floor Stops: Where wall type bumpers cannot be used, provide dome type, floor mounted stops of the proper height as follows:
1. Ives - 436, 438
 2. Door Controls - 3310X, 3320X
 3. Rockwood - 440, 442
 4. Do not mount floor stops where they will impede traffic.
- F. Exterior doors striking masonry and doors specified to have door stops and holders, shall have cast bronze wall or floor type door stops with hook or staple type holders to selectively hold doors in open position. The following will be acceptable:
1. Ives - 445, 446
 2. Door Controls - 3237X, 3347X
 3. Rockwood - 473, 477
- G. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.
- H. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

2.12 DOOR GASKETING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Door Gasketing:
 - a. National Guard Products, Inc. (NGP).
 - b. Pemko Manufacturing Co., Inc. (PEM).
 - c. Reese Enterprises, Inc. (RE).
 - d. Zero International, Inc. (ZRO).
 2. Door Bottoms:
 - a. National Guard Products, Inc. (NGP).
 - b. Pemko Manufacturing Co., Inc. (PEM).
 - c. Reese Enterprises, Inc. (RE).
 - d. Zero International, Inc. (ZRO).
- B. Standard: Comply with BHMA A156.22.

- C. Weatherstripping: Provide continuous weather-strip gasketing on exterior doors, No. A626A by National Guard Products or approved substitute. Provide door bottom sweep No. 95WH by National Guard Products or approved substitute. Provide meeting stile gaskets No. 600A by National Guard Products or approved substitute.
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- D. Smoke Gasketing: Provide silicone bulb smoke seal; No 5050 by National Guard Products or approved substitute, color as selected by Architect.
- E. Fire Gasketing: Provide No. 9440 by National Guard Products or approved substitute. Color as selected by the Architect.

2.13 THRESHOLDS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Hager Companies (HAG).
 - 2. National Guard Products, Inc. (NGP).
 - 3. Pemko Manufacturing Co., Inc. (PEM).
 - 4. Reese Enterprises, Inc. (RE).
 - 5. Zero International, Inc. (ZRO).
- B. Standard: Comply with BHMA A156.21.
- C. Provide No. 896 with door bottom sweep No. 95WH by National Guard Products or approved substitute.

2.14 FABRICATION

- A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means

of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

2. Steel Machine or Wood Screws: For the following fire-rated applications:
 - a. Mortise hinges to doors.
 - b. Strike plates to frames.
 - c. Closers to doors and frames.
3. Steel Through Bolts: For the following fire-rated applications, unless door blocking is provided:
 - a. Surface hinges to doors.
 - b. Closers to doors and frames.
 - c. Surface-mounted exit devices.
4. Spacers or Sex Bolts: For through bolting of hollow metal doors.
5. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.15 FINISHES

- A. Standard: Comply with BHMA A156.18.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide the following finishes:
 1. Butts and Hinges: 26D
 2. Locks & Lock Trim: 26D
 3. Door Controls - Closers: Sprayed Alum. Finish
 4. Mortise Locks & Latches: 26D
 5. Door Stops 26D/32D
 6. Weatherstripping Aluminum
 7. Threshold Aluminum
 8. Kickplates 32D
 9. Pulls 32D

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
 - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.
- B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:
 - 1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
 - 2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
 - 3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.7 DOOR HARDWARE SCHEDULE

- A. The hardware sets listed below indicate the items of hardware required for each opening. It is the bidders responsibility to accurately furnish the proper quantities, items, sizes, weights and functions as required by the plans and specifications. If an opening has, through error, been omitted from the following hardware sets, it shall be the bidders responsibility to supply hardware of equivalent quality and quantity, as that which is specified for a comparable opening.

HW1

Doors 204, 301, 401

Hinges
Lockset (function E)
Closer
Weatherstripping
Door Bottom Sweep
Kickplate
Threshold
Floor Stop

HW2

Doors 002

Hinges
Closer
Lockset (function 1)
Fire Gasketing

HW3

Doors 305, 306, 403

Hinges

Lockset (function 6)
Door Stops

HW4

Doors 101, 205, 302

Hinges
Closer
Lockset (function 4)
Kickplate
Wall Stop
Fire Gasketing

HW5

Doors 304

Hinges
Closer
Lockset (function 3)
Kickplate
Wall Stop
Fire Gasketing

HW6

Doors 106

Hinges
Lockset (function 3)
Wall Stop

HW7

Doors 202

Hinges
Closers
Coordinator
Lockset (function 4)
Flush Bolts
Magnetic Holders
Fire Gasketing

HW8

Doors 303

Hinges
Lockset (function 4)
Closer
Fire Gasketing

HW9

Gate at Service Counter

2 - Hinges

Lockset (function 3)

END OF SECTION

SECTION 08800

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Windows.
 - 2. Doors.
 - 3. Interior borrowed lites.

1.2 DEFINITIONS

- A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.
- B. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.
- C. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.
- D. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements or as indicated in the glazing schedules:

- a. Specified Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour (meters per second) at 33 feet (10 m) above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.4.2, "Analytic Procedure," based on mean roof heights above grade indicated on Drawings.
 - b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - 1) Load Duration: 60 seconds or less.
 - c. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch (25 mm), whichever is less.
 - 1) For monolithic-glass lites heat treated to resist wind loads.
 - 2) For insulating glass.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass.
 - 1. Insulating glass for each designation indicated.
- C. Glazing Schedule: Use same designations indicated in this section for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- D. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
- E. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations for Insulating Glass: Obtain insulating-glass units from one manufacturer using the same type of glass and other components for each type of unit indicated.
- C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.

1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- E. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- F. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.
- G. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.
- H. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following inspecting and testing agency:
 1. Insulating Glass Certification Council.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).

1.8 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty on Laminated Glass: Written warranty, made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 1. Warranty Period: Five years from date of Substantial Completion.

- C. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 HEAT-TREATED FLOAT GLASS

- A. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
- B. Clear Tempered Float Glass: ASTM C 1048; Type I (transparent glass, flat); Quality q3 (glazing select); Class 1 (clear), Kind FT (fully tempered), 1/4 inch (6 mm) thick.

2.2 FIRE-RATED GLASS

- A. Fire-Rated and Safety-Rated Glass: 5/16 inch (8 mm) thick laminated fire-rated and impact safety-rated glazing material.
1. Product: FireLite Plus® by TGP.
 2. Application: Fire-rated doors and sidelites.

2.3 INSULATING GLASS

- A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article.
1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article.
 2. Provide Kind FT (fully tempered) where safety glass or tinted glass is indicated.
- B. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the this article are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
- C. Sealing System: Dual seal, with primary and secondary sealants as follows:
1. Polyisobutylene and silicone.
- D. Spacer Specifications: Manufacturer's standard spacer material and construction.
- E. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
1. Aluminum with mill or clear-anodized finish.
 2. Desiccant: Molecular sieve or silica gel, or blend of both.
 3. Corner Construction: Manufacturer's standard corner construction.

- F. Insulating Glass: Where glass of this designation is indicated, provide uncoated insulating-glass units complying with the following:
1. Overall Unit Thickness and Thickness of Each Lite: 16 and 3 mm
 2. Interspace Content: Air.
 3. Indoor Lite: Type I (transparent glass, flat), Class 1 (clear) float glass.
 4. Outdoor Lite: Type I (transparent glass, flat) float glass.
 - a. Class 1 (clear).
 5. Application: Exterior hollow metal doors.

2.4 ELASTOMERIC GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range for this characteristic.
- B. Elastomeric Glazing Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant, including those referencing ASTM C 920 classifications for type, grade, class, and uses.
1. Additional Movement Capability: Where additional movement capability is specified in the Glazing Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements in ASTM C 920 for uses indicated.
- C. Low-Modulus Nonacid-Curing Silicone Glazing Sealant: Where glazing sealants of this designation are indicated, provide products complying with the following:
1. Products: Available products include the following:
 - a. 790; Dow Corning.
 - b. Silpruf; GE Silicones.
 - c. 864; Pecora Corporation.
 - d. Omniseal; Sonneborn, Div of ChemRex, Inc.
 - e. Spectrem I; Tremco.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.
 5. Applications: Wet sealant installations.

2.5 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for

application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 2. Presence and functioning of weep system.
 3. Minimum required face or edge clearances.
 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where the length plus width is larger than 50 inches (1270 mm) as follows:
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 PROTECTION AND CLEANING

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION

SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Interior gypsum wallboard.
 - 2. Tile backing panels.
 - 3. Non-load-bearing steel framing.
 - 4. Firestopping.

1.2 DEFINITIONS

- A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.
- C. Samples: For the following products:
 - 1. Trim Accessories: Full-size sample in 12-inch- (300-mm-) long length for each aluminum trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory" and GA-600, "Fire Resistance Design Manual."
- B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
 - 1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Steel Framing and Furring:
 - a. Dietrich Industries, Inc., UltraSteel™ Framing.
 - b. MarinoWare; Division of Ware Ind.
 - c. National Gypsum Company.
 - d. The Steel Network, Inc.
 - e. Unimast, Inc.
 - 2. Gypsum Board and Related Products:
 - a. G-P Gypsum Corp.
 - b. National Gypsum Company.
 - c. United States Gypsum Co.

2.2 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Components, General: Comply with ASTM C 754 for conditions indicated.
- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.
- C. Hangers: As follows:
 - 1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12-mm) diameter.
 - 2. Rod Hangers: ASTM A 510 (ASTM A 510M), mild carbon steel.
 - a. Diameter: 1/4-inch (6.34-mm).
 - b. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
 - 3. Flat Hangers: Commercial-steel sheet, ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized.
 - a. Size: 1 by 3/16 inch (25.4 by 4.76 mm) by length indicated.
 - 4. Angle Hangers: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized commercial-steel sheet.

- a. Minimum Base Metal Thickness: 0.0312 inch (0.79 mm).
 - b. Size: 1-5/8 by 1-5/8 inches (41.3 by 41.3 mm).
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch (1.37 mm), a minimum 1/2-inch- (12.7-mm-) wide flange, with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating.
- 1. Depth: 1-1/2 inches (38.1 mm).
- E. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating.
- 1. Steel Studs: ASTM C 645.
 - a. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
 - b. Depth: 1-5/8 inches (41.3 mm), unless noted otherwise.
 - 2. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.
 - a. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
 - 3. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical, with face attached to single flange by a slotted leg (web).
- F. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armstrong World Industries, Inc.; Furring Systems/Drywall.
 - b. Chicago Metallic Corporation; Drywall Furring 640 System.
 - c. USG Interiors, Inc.; Drywall Suspension System.

2.3 STEEL PARTITION AND SOFFIT FRAMING

- A. Components, General: As follows:
- 1. Comply with ASTM C 754 for conditions indicated.
 - 2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating, or equivalent per ASTM A1003.
- B. Steel Studs and Tracks: ASTM C 645.
- 1. Minimum Base Metal Thickness: [0.0179 inch (0.45 mm) (25 gage)] [0.027 inch (0.7 mm) (22 gage)] [0.0329 inch (0.84 mm) (20 gage)].
 - 2. Depth: As indicated on the plans.
- C. Deep-Leg Deflection Track: ASTM C 645 top runner with [2] [4]-inch- (50.8-mm-) deep flanges.
- D. Proprietary Firestop Track: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- 1. Available Product: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fire Trak Corp.; Fire Trak.
 - b. Metal-Lite, Inc.; The System.

- c. The Steel Network, Inc.; VertiClip SLD or VertiTrack VTD.
 - d. Dietrich: SLP-TRK Slotted Track.
- E. Cold-Rolled Channel Bridging: 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange.
- 1. Depth: 1-1/2 inches (38.1 mm).
 - 2. Clip Angle: 1-1/2 by 1-1/2 inch (38.1 by 38.1 mm), 0.068-inch- (1.73-mm-) thick, galvanized steel or BridgeClip by The Steel Network, Inc.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
- 1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
 - 2. Depth: 7/8 inch (22.2 mm).
- G. Masonry Furring Channels: Adjustable wall furring designed for use on split-faced block with cold-rolled channel. Provide No. FCWB by Dietrich or approved substitute.
- H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (31.8 mm), wall attachment flange of 7/8 inch (22.2 mm), minimum bare metal thickness of 0.0179 inch (0.45 mm), and depth required to fit insulation thickness indicated.
- I. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.4 INTERIOR GYPSUM WALLBOARD

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Gypsum Wallboard: ASTM C 36.
- 1. Type X:
 - a. Thickness: 5/8 inch (15.9 mm).
 - b. Long Edges: Tapered.
 - c. Location: Vertical and horizontal surfaces, unless otherwise indicated.
- C. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
- 1. Back and face side: Glass fiber mat resists growth of mold or mildew (per ASTM D 3273).
 - 2. Core: Noncombustible gypsum core (ASTM E 136).
 - 3. Thickness: 5/8 inch.
 - 4. Long edges: Tapered;
 - 5. Basis of design Product: "DensArmor Plus" as manufactured by G-P Gypsum.

2.5 TILE BACKING PANELS

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M.
- 1. Available Product: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, "Dens-Shield Tile Backer" manufactured by G-P Gypsum Corp.

2. Product: Subject to compliance with requirements, provide "Dens-Shield Tile Backer" manufactured by G-P Gypsum Corp.
3. Core: 5/8 inch (15.9 mm), Type X.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. Material:
 - a. Galvanized steel sheet or rolled zinc at corners.
 - b. Plastic where abutting exterior metal doors and windows.
 2. Shapes:
 - a. Cornerbead: Use at outside corners, unless otherwise indicated.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges or where abutting different materials.
 - c. Expansion (Control) Joint:
 - 1) Metal zinc control joint: .093 by USG or Gold Bond. Use where indicated on the drawings
 - 2) Plastic E-Z Strip control joint by Gold Bond, use where not indicated on the drawings. Install over door jambs or in walls at a maximum of 30 feet on center.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
 1. Interior Gypsum Wallboard: Paper.
 2. Mold-Resistant Gypsum Wallboard: 10-by-10 glass mesh.
 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound or drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use setting-type, sandable topping compound or drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Interior Mold-Resistant Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 3. Fill Coat: For second coat, use setting-type, sandable topping compound or drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

- E. Joint Compound for Tile Backing Panels:
 - 1. Water-Resistant Gypsum Backing Board: Use setting-type taping and setting-type, sandable topping compounds.
 - 2. Glass-Mat, Water-Resistant Backing Panel: As recommended by manufacturer.
 - 3. Cementitious Backer Units: As recommended by manufacturer.

2.8 ACOUSTICAL SEALANT

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. Pecora Corp.; AC-20 FTR Acoustical and Insulation Sealant.
 - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.9 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from glass; with maximum flame-spread and smoke-developed indices of 10 and 10, respectively; passing ASTM E 136 for combustion characteristics.
 - 1. Available Products:
 - a. CertainTeed Corporation.
 - b. Johns Manville Corporation.
 - c. Owens Corning.
- D. Firestopping: As specified in Division 7 Section "Through-Penetration Firestop Systems."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING STEEL FRAMING, GENERAL

- A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.
- B. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.
 - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
 - a. Use deep-leg deflection track, unless noted otherwise.
 - b. Use proprietary firestop track at fire rated assemblies and where indicated.
- C. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

3.3 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Suspend ceiling 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 ceiling suspension system. 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 the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 4. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, 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 support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 6. Do not attach hangers to steel deck tabs.
 - 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member and transversely between parallel members.
- C. Sway-brace suspended steel framing, 4 feet on center, with hangers used for support.
- D. Screw furring to wood framing.
- E. Wire-tie furring channels to supports.

- F. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.
 1. Hangers: 48 inches (1219 mm) o.c.
 2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
 3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- G. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.4 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

- A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
 1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
- D. Install steel studs and furring at the following spacings:
 1. Single-Layer Construction: 16 inches (406 mm) o.c., unless otherwise indicated.
 2. Multilayer Construction: 16 inches (406 mm) o.c., unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
- F. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. 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.
 1. Install two 0.312 inch (0.79 mm) (20 gage) studs at each jamb, unless otherwise indicated.
 2. 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.
 3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- G. 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.

3.5 APPLYING AND FINISHING PANELS, GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Form control and expansion joints with space between edges of adjoining gypsum panels.
- I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffer, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffer, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- J. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with LC-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- K. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- L. Fire-Resistance-Rated Gypsum Board Assemblies: Provide firestop system at the top of fire-resistance-rated gypsum board assemblies. Provide firestop system around any structural penetration of wall assembly.

- M. Smoke-Rated Gypsum Board Assemblies: Provide a tight, taped joint at the top of smoke-rated assemblies and around any penetrations to assemblies at both side of the assembly. The use of acoustical sealant will be acceptable to fill gaps up to 3/8 inch wide.
- N. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
 - 1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
- O. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.6 PANEL APPLICATION METHODS

- A. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
- B. Multilayer Application on Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints at least one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
- C. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
- D. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- E. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- F. Tile Backing Panels:
 - 1. Water-Resistant Gypsum Backing Board: Install at showers, tubs, and where indicated. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
 - 2. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
 - 3. Areas Not Subject to Wetting: Install standard gypsum wallboard panels to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.
 - 4. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.7 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings, or if not indicated, install control joints not over 30 feet apart and in specific locations approved by Architect for visual effect.

3.8 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
 - 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
 - 2. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, and for fire-resistance-rated and sound-rated assemblies, unless otherwise indicated.
- E. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
 - 1. Complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air-duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control-air tubing.
 - f. Installation of ceiling support framing.
 - g. Installation of Through Penetration Firestop Systems.

END OF SECTION

SECTION 09265

GYPSON BOARD SHAFT-WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Shaft enclosures.
 - 2. Horizontal enclosures.

1.2 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board construction not defined in this Section or in other referenced standards.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance:
 - 1. Provide gypsum board shaft-wall assemblies capable of withstanding the full air-pressure loads indicated for maximum heights of partitions without failing and while maintaining an airtight and smoke-tight seal. Evidence of failure includes deflections exceeding limits indicated, bending stresses causing studs to break or to distort, and end-reaction shear causing track (runners) to bend or to shear and studs to become crippled.
 - 2. Provide gypsum board shaft-wall assemblies for horizontal duct enclosures capable of spanning distances indicated within deflection limits indicated.
 - 3. Air-pressure loads and deflection limits are specified in "Gypsum Board Shaft Wall" Article in Part 2.

1.4 SUBMITTALS

- A. Product Data: For each gypsum board shaft-wall assembly indicated.
- B. Fire-Test-Response Reports: From a qualified independent testing and inspecting agency substantiating each gypsum board shaft-wall assembly's required fire-resistance rating.
 - 1. Include data substantiating that elevator entrances and other items that penetrate each gypsum board shaft-wall assembly do not negate fire-resistance rating.
- C. Research/Evaluation Reports: Evidence of compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction that substantiate required fire-resistance rating for each gypsum board shaft-wall assembly.
- D. Acoustical-Test-Response Reports: From a qualified independent testing agency substantiating required STC rating for each gypsum board shaft-wall assembly.

1.5 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, and bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat on leveled supports off the ground to prevent sagging.

1.7 PROJECT CONDITIONS

- A. Comply with requirements for environmental conditions, room temperatures, and ventilation specified in Division 9 Section "Gypsum Board Assemblies"

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Gypsum Co.
 - 2. G-P Gypsum Corp.
 - 3. National Gypsum Company.
 - 4. United States Gypsum Co.

2.2 ASSEMBLY MATERIALS

- A. General: Provide materials and components complying with requirements of fire-resistance-rated assemblies indicated.
 - 1. Provide panels in maximum lengths available to eliminate or minimize end-to-end butt joints.
 - 2. Provide auxiliary materials complying with gypsum board shaft-wall assembly manufacturer's written recommendations.
- B. Steel Framing: ASTM C 645.
 - 1. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized coating.
- C. Gypsum Liner Panels: Manufacturer's proprietary liner panels in 1-inch (25.4-mm) thickness and with moisture-resistant paper faces.

- D. Gypsum Wallboard: ASTM C 36, core type as required by fire-resistance-rated assembly indicated.
 - 1. Edges: Tapered.
- E. Accessories: Cornerbead, edge trim, and control joints of material and shapes specified in Division 9 Section "Gypsum Board Assemblies" that comply with gypsum board shaft-wall assembly manufacturer's written recommendations for application indicated.
- F. Gypsum Wallboard Joint-Treatment Materials: ASTM C 475 and as specified in Division 9 Section "Gypsum Board Assemblies."
- G. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- H. Track (Runner) Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft-wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
 - 1. Powder-Actuated Fasteners: Provide powder-actuated fasteners with capability to sustain, without failure, a load equal to 10 times that imposed by shaft-wall assemblies, as determined by testing conducted by a qualified independent testing agency according to ASTM E 1190.
 - 2. Postinstalled Expansion Anchors: Where indicated, provide expansion anchors with capability to sustain, without failure, a load equal to 5 times that imposed by shaft-wall assemblies, as determined by testing conducted by a qualified independent testing agency according to ASTM E 488.
- I. Sound Attenuation Blankets: ASTM C 665 for Type I, unfaced mineral-fiber-blanket insulation produced by combining thermosetting resins with mineral fibers manufactured from slag or rock wool.

2.3 GYPSUM BOARD SHAFT WALL

- A. Basis-of-Design Product: As indicated on Drawings by design designation of a qualified testing and inspecting agency.
- B. Sustained Air-Pressure Loads: 5 lbf/sq. ft. (0.24 kPa).
- C. Deflection Limit: L/360.
- D. Studs: Manufacturer's standard profile for repetitive members and corner and end members and for fire-resistance-rated assembly indicated.
 - 1. Depth: As indicated.
 - 2. Minimum Base Metal Thickness: Manufacturer's standard thicknesses that comply with structural performance requirements for stud depth indicated.
- E. Track (Runner): Manufacturer's standard J-profile track with long-leg length as standard with manufacturer, but at least 2 inches (51 mm), in depth matching studs.
 - 1. Minimum Base Metal Thickness: Manufacturer's standard thicknesses that comply with structural performance requirements for stud depth indicated.

- F. Jamb Struts: Manufacturer's standard J-profile strut with long-leg length of 3 inches (76.2 mm), in depth matching studs, and not less than 0.0341 inch (0.87 mm) thick.
- G. Room-Side Finish: Gypsum board.
- H. Shaft-Side Finish: As indicated by fire-resistance-rated assembly design designation.
- L. Cavity Insulation: Sound attenuation blankets.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install gypsum board shaft-wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and the following:
 - 1. ASTM C 754 for installing steel framing.
 - 2. Division 9 Section " Gypsum Board Assemblies" for applying and finishing panels.
- B. Do not bridge building expansion joints with shaft-wall assemblies; frame both sides of joints with furring and other support.
- C. Install supplementary framing in gypsum board shaft-wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, and similar items that cannot be supported directly by shaft-wall assembly framing.
- D. At penetrations in shaft wall, maintain fire-resistance rating of shaft-wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- E. Isolate gypsum finish panels from building structure to prevent cracking of finish panels while maintaining continuity of fire-rated construction.
- F. Install control joints to maintain fire-resistance rating of assemblies.
- G. Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly. Install acoustical sealant to withstand dislocation by air-pressure differential between shaft and external spaces; maintain an airtight and smoke-tight seal; and comply with manufacturer's written instructions or ASTM C 919, whichever is more stringent.

END OF SECTION

SECTION 09511

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes ceilings consisting of acoustical panels and exposed suspension systems.

1.2 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
 - 1. 6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.
 - 2. Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.
- C. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
 - 1. Fire-response tests were performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
 - 2. Surface-burning characteristics of acoustical panels comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.
 - 3. Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," from ITS/Warnock Hersey's "Directory of Listed Products,"

or from the listings of another testing and inspecting agency, are identical in materials and construction to those tested per ASTM E 119.

4. Products are identified with appropriate markings of applicable testing and inspecting agency.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.6 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 1. Acoustical Ceiling Units: Full-size units equal to 2.0 percent of amount installed.
 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated for each designation in the following paragraphs of Part 2.

2.2 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
1. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
1. Where appearance characteristics of acoustical panels are indicated by referencing ASTM E 1264 pattern designations and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range of products that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- C. Antimicrobial Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial solution consisting of a synergistic blend of substituted ammonium salts of alkylated phosphoric acids admixed with free alkylated phosphoric acid that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria.
- D. Water-Felted, Mineral-Base Acoustical Panels for Acoustical Panel Ceiling SAT-1: Where this designation is indicated, provide acoustical panels complying with the following:
1. Products: Provide one of the following:
 - a. Armstrong Dune No. 1729.
 - b. BPB Sand Micro SHM-154.
 - c. USG Olympia Micro ClimaPlus 4221.
 2. Classification: Panels fitting ASTM E 1264 for type and form as follows:
 - d. Type III, mineral base with painted finish; Form 1 or 2, water felted.
 3. Pattern: Panels fitting ASTM E 1264 pattern designation (description) C (perforated, small holes and E (lightly textured)).
 4. Color: White.
 5. Light Reflectance Coefficient: Not less than LR 0.80.
 6. Noise Reduction Coefficient: NRC 0.50.
 7. Ceiling Attenuation Class: Not less than CAC 35.
 2. Edge Detail: Angled reveal, sized to fit flange of exposed suspension system members.
 3. Thickness: 5/8 inch (16 mm).
 4. Size: 24 by 24 inches (610 by 610 mm).
- E. Water-Felted, Mineral-Base Acoustical Panels for Acoustical Panel Ceiling (Existing Ceilings): Where this designation is indicated, provide acoustical panels complying with the following:
1. Products: Provide one of the following:
 - a. Armstrong Cortega, No. 770.
 2. Classification: Panels fitting ASTM E 1264 for Type III, mineral base with painted finish; Form 2, water felted.
 3. Pattern: Panels fitting ASTM E 1264 pattern designation (description) C (perforated, small holes); D (fissured).
 4. Color: White.
 5. Light Reflectance Coefficient: Not less than LR 0.80.
 6. Noise Reduction Coefficient: NRC 0.55.
 7. Ceiling Attenuation Class: Not less than CAC 35.
 8. Edge Detail: Square.

9. Thickness: 5/8 inch (16 mm).
10. Size: 24 by 24 inches (610 by 610 mm).

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, UL certified load compliance, and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Suspension System for Acoustical Panel Ceilings: Where this designation is indicated, provide acoustical panel ceiling suspension system complying with the following:
 1. Products: Provide one of the following:
 - a. Prelude 15/16" Exposed Tee System; Armstrong World Industries, Inc.
 - b. S11 System; Celotex Corporation.
 - c. 1200 System; Chicago Metallic Corporation.
 - d. DX 24 System; USG Interiors, Inc.
 2. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G01 (Z001) coating designation, with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges; other characteristics as follows:
 - a. Structural Classification: Intermediate-duty system.
 - b. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
 - c. Face Design: Flush face.
 - d. Cap Material: Steel sheet.
 - e. Cap Finish: Painted white.
- C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
 1. Postinstalled Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.
- F. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

- G. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- H. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
- I. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
 - 1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- J. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.
 - 1. Available Product: UHDC by Armstrong or L15 by USG.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
 - 1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
 5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m). Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim except where required for vertical framing.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 3. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

4. Paint cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
5. Install hold-down clips in areas within 10 feet of exterior doors or vestibule doors; space as recommended by panel manufacturer's written instructions, unless otherwise indicated or required.

3.4 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before Contractor installs acoustical panel ceilings, conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of acoustical panels until deficiencies have been corrected.
 1. Complete the following in areas to receive gypsum board ceilings:
 - a. Installation of 80 percent of lighting fixtures, powered for operation.
 - b. Installation, insulation, and leak and pressure testing of water piping systems.
 - c. Installation of air-duct systems.
 - d. Installation of air devices.
 - e. Installation of mechanical system control-air tubing.
 - f. Installation of through-penetration firestop systems.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09680

CARPET

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Tufted carpet.
 - 2. Resilient wall base and accessories.
- B. Related Sections include the following:
 - 1. Division 1 Section "Allowances" for additional information on allowances to be carried by this section.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate required.
- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet: 12-inch- (300-mm-) square Sample.
 - 2. For resilient accessories, manufacturer's standard-size samples, but not less than 12 inches (300 mm) long, of each resilient accessory color and pattern specified.
- C. Product Schedule: Use same room and product designations indicated on Drawings and in schedules.
- D. Maintenance Data: For carpet to include in maintenance manuals specified in Division 1. Include the following:
 - 1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 - 2. Precautions for cleaning materials and methods that could be detrimental to carpet.
- E. CRI Labels: Provide data or certificates showing the carpet and adhesives meet the requirements of CRI Indoor Air Quality Carpet and Adhesive Testing Programs.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Product Options: Products and manufacturers named in Part 2 establish requirements for product quality in terms of appearance, construction, and performance. Other manufacturers' products comparable in quality to named products and complying with requirements may be considered. Refer to Division 1 Section "Product Requirements."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with CRI 104, Section 5, "Storage and Handling."

1.5 PROJECT CONDITIONS

- A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.6 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Carpet Warranty: Written warranty, signed by carpet manufacturer agreeing to replace carpet that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

2. Furnish not less than 10 linear feet (3 linear m) for each type, color, pattern, and size of resilient accessory installed.

PART 2 - PRODUCTS

2.1 CARPET

- A. Products: Allow \$24 per square yard for carpet material only, labor to be included as part of the work of this section.

2.2 RESILIENT ACCESSORIES

- A. Rubber Base: Where this designation is indicated, provide rubber wall base complying with FS SS-W-40, Type I and the following:
 1. Products: As follows:
 - a. Armstrong World Industries
 - b. Johnsonite.
 2. Color and Pattern: As selected by Architect from manufacturer's full range of colors and patterns produced for rubber wall base complying with requirements indicated.
 3. Style: Cove with top-set toe.
 4. Minimum Thickness: 1/8 inch (3.2 mm).
 5. Height: 4 inches (101.6 mm).
 6. Lengths: 120 feet (36.6 m) long.
 7. Outside Corners: Job formed.
 8. Inside Corners: Job formed.
 9. Surface: Smooth.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by the following:
 1. Carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and that is recommended by the following:
 1. Carpet manufacturer.
- C. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- D. Adhesives for Accessories: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
- E. Primer: Provide products recommended by carpet manufacturer. Provide primer that is compatible with adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Verify that substrates and conditions are satisfactory for carpet installation and comply with requirements specified.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond.
 - 2. Verify that adhesion and dryness characteristics have been determined as required in Division 7 Section "Vapor Retarders, Vapor Barriers, and Air Barriers" and meet flooring manufacturer's recommendations.
 - a. If alkaline content is greater than 9, or is such that it may cause future delaminating of the carpet, per manufacturer's printed instructions, coordinate with General Contractor for the application of carpet manufacturer's recommended primer, adhesives and seam sealers.
 - 3. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving carpet.
 - 4. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. For wood subfloors, verify the following:
 - 1. Underlayment over subfloor complies with requirements specified in Division 6 Section "Rough Carpentry."
 - 2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.
- B. Cut carpet bails open to full length of rolls to allow the carpet to ventilate a minimum of 72 hours prior to installation.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill minor cracks, holes, and depressions in substrates.
- D. Coordinate with General Contractor for the removal of coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Direct-Glue-Down Installation: Install carpet in strict accordance with the Carpet and Rug Institute's IAQ (indoor air quality) Installation guidelines as well as with the U.S. Environmental Protection Agency's guidelines. Install carpet in accordance with the recommendations in CRI 104 and the carpet manufacturer's specifications.
- B. Stair Installation: Comply with CRI 104, Section 12, "Carpet on Stairs." Provide contact cement on risers for adhesive.
- C. Comply with carpet manufacturer's written recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Install pattern parallel to walls and borders.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. General: Install resilient accessories according to manufacturer's written installation instructions.
- B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, locker bases, and other permanent fixtures in rooms and areas where base is required.
 - 1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
 - 2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 - 3. Do not stretch base during installation.
 - 4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 5. Form outside corners on job from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 6. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.
- C. Place resilient accessories so they are butted to adjacent materials and bond to substrates with adhesive.

3.5 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove yarns that protrude from carpet surface.
 - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 15, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

3.6 BUILDING VENTILATION

- A. Operate the building ventilation systems at maximum outdoor air flow before, during and 72 hours after the new carpet installation. Open windows and/or doors when possible during the carpet installation.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and field painting of the following:
 - 1. Exposed exterior items and surfaces.
 - 2. Exposed interior items and surfaces.
 - 3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

- B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
 - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1.2 SUBMITTALS

- A. Product Data: For each paint system specified. Include block fillers and primers.
 - 1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
 - 3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

- B. Samples for Selection: Manufacturer's color chips showing the full range of colors available for each type of finish-coat material indicated.
 - 1. After color selection, the Architect will furnish color list of color selections for surfaces to be coated.

1.3 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Comply with procedures specified in PDCA P5. Duplicate finish of approved prepared samples.
 - 1. The Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
 - a. Wall Surfaces: Provide samples on at least 100 sq. ft. (9 sq. m) of wall surface.
 - b. Small Areas and Items: The Architect will designate an item or area as required.
 - 2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.
 - a. After finishes are accepted, the Architect will use the room or surface to evaluate coating systems of a similar nature.
 - 3. Final approval of colors will be from job-applied samples.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.5 PROJECT CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F (10 and 32 deg C).
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F (7.2 and 35 deg C).
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.6 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.
 - 1. Quantity: Furnish the Owner with an additional 5 percent, but not less than 1 gal. (3.785 L) or 1 case, as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.
 - 1. California Paint Co. (Cal).
 - 2. Benjamin Moore & Co. (Moore).
 - 3. ICI Dulux Paints (ICI)
 - 4. PPG Industries, Inc. (PPG).
 - 5. Sherwin-Williams Co. (S-W).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality professional paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
 - 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors: Provide color selections made by the Architect. Allow for up to 10 different color selections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.
 - 1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 - 2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION FOR SURFACES

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and reprime.
 - 2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
 - c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
 - 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
 - c. When transparent finish is required, backprime with spar varnish.
 - d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
 - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.
 - d. Piece Marks: Remove piece marks or numbers and characters that identify components for erection prior to field painting. Applying a primer to cover the marks will also be acceptable.
 5. Galvanized Surfaces: Clean galvanized surfaces with a palm sander and 60 grit sandpaper so surface is free of surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
 6. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
- D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint primer of colors such as reds, yellows, and oranges with a gray basecoat system designed to help provide color coverage.
1. Do not tint prime or base coat for multi-colored finishes.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
 10. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer on metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces. When using colors such as red, yellow or orange, an extra coat of finish may be necessary. Notify Architect when additional coats do not fix the problem.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.
- F. Rated Partition Labeling: Partitions in the construction area that are shown to have a fire or smoke rating shall be labeled. Label each partitions between 6 and 18 inches above the ceiling. Labels shall consist of 4 inch high letters painted in bright orange color. Place labels approximately 5 feet on center on both sides of wall. Label schedule shall be as follows:
1. For smoke walls: "Smoke Rated Wall"
 2. For 1 hour walls: "One Hour Rated Wall"
 3. For 2 hour walls: "Two Hour Rated Wall"
- G. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

- H. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- I. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- J. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
 - 1. Provide satin finish for final coats.
- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.5 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
 - 1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.6 EXTERIOR PAINT SCHEDULE

- A. Ferrous Metal: Provide the following finish systems over exterior hollow metal doors and frames. Primer is required on shop-primed items.
 - 1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a rust-inhibitive primer.
 - a. Primer: Rust-inhibitive metal primer applied at spreading rate recommended by the manufacturer.
 - 1) Cal: Larcoloid Latex Metal Primer 51108.
 - 2) ICI: 4020-XXXX, Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish.
 - 3) Moore: DTM Acrylic Semi-Gloss M29.
 - 4) PPG: 6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer.
 - 5) S-W: DTM Acrylic Primer/Finish B66W1 Series.

- b. First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer.
 - 1) Cal: 100 % Acrylic Latex Satin Gloss 2010 402XX.
 - 2) ICI: 4206-XXXX, Devflex Interior/Exterior Acrylic Semi-Gloss Enamel.
 - 3) Moore: DTM Acrylic Semi-Gloss M29.
 - 4) PPG: Speedhide Exterior Semi-Gloss Latex, 6-900 Series.
 - 5) S-W: DTM Acrylic Coating Gloss (Waterborne) B66W200 Series.

- B. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated (galvanized) metal surfaces; exterior stair:
 - 1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a galvanized metal primer.
 - a. Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer.
 - 1) Cal: Larcoloid Latex Metal Primer 51108.
 - 2) ICI: 4020-XXXX, Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish.
 - 3) Moore: DTM Acrylic Semi-Gloss M29.
 - 4) PPG: 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel.
 - 5) S-W: DTM Acrylic Primer/Finish B66W1 Series.
 - b. First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer.
 - 1) Cal: 100 % Acrylic Latex Satin Gloss 2010 402XX.
 - 2) ICI: 4206-XXXX Devflex Interior/Exterior Waterborne Acrylic Semi-Gloss Enamel
 - 3) Moore: DTM Acrylic Semi-Gloss M29.
 - 4) PPG: Speedhide Exterior Semi-Gloss Latex, 6-900 Series.
 - 5) S-W: DTM Acrylic Semi-Gloss B66-200 Series.

3.7 INTERIOR PAINT SCHEDULE

- A. Concrete Masonry Units: Provide the following finish systems over interior concrete masonry block units:
 - 1. Low VOC, Eggshell, Acrylic-Enamel Finish: 2 finish coats over a block filler.
 - a. Block Filler: High-performance, latex-based, block filler applied at spreading rate recommended by the manufacturer.
 - 1) Moore: Super Craft Latex Block Filler #285.
 - 2) ICI: 3100-1200, Ultra-Hide Gripper Interior/Exterior Block Surfer.
 - 3) PPG: 6-7 Speedhide Interior/Exterior Masonry Latex Block Filler.
 - 4) S-W: PrepRite Block Filler B25W25 Series.
 - b. First and Second Coats: Eggshell, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer.
 - 1) Moore: Pristine Eco Spec Interior Latex Eggshell, No. 223
 - 2) ICI: LifeMaster 2000 Interior Eggshell, LM9300
 - 3) PPG: Pure Performance Eggshell Interior Latex, 9-411 Series.
 - 4) SW: Harmony® Interior Latex Eg-Shel, B9 Series.

- B. Hi-Build Primer for Mold Resistant Gypsum Board: Provide the following finish systems over interior mold-resistant gypsum board surfaces:
 - 1. High-Build Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer.
 - a. Cal: Hide-A-Spray, 91-20.

- b. ICI: 1040-1200, Prep & Prime High Build Fill & Seal.
 - c. SW: PrepRite High Build Interior Latex Primer/Surfacer B28W601.
- C. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
- 1. Low-Voc, Flat Acrylic Ceiling Finish: 2 finish coats over a primer.
 - a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer.
 - 1) Moore: Pristine Eco Spec Interior Latex Primer Sealer, No. 231
 - 2) ICI: LifeMaster 2000 Interior Primer-Sealer, LM9116
 - 3) PPG: Pure Performance Interior Latex Primer, 9-2 Series.
 - 4) SW: Harmony® Interior Latex Primer, B11W900 Series.
 - b. First and Second Coats: Flat, acrylic-latex-based, interior paint applied at spreading rate recommended by the manufacturer.
 - 1) ICI: 1210-XXXX, Ultra-Hide Latex Flat Interior Wall Paint.
 - 2) Moore: Super Spec Latex Flat #275.
 - 3) PPG: Speedhide Interior Flat Latex, 6-70 Series.
 - 4) S-W: Harmony® Interior Latex Flat B5 Series.
 - 2. Low VOC, Eggshell, Acrylic-Enamel Wall Finish: 2 finish coats over a primer.
 - a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer.
 - 1) Moore: Pristine Eco Spec Interior Latex Primer Sealer, No. 231
 - 2) ICI: LifeMaster 2000 Interior Primer-Sealer, LM9116
 - 3) PPG: Pure Performance Interior Latex Primer, 9-2 Series.
 - 4) SW: Harmony® Interior Latex Primer, B11W900 Series.
 - b. First and Second Coats: Eggshell, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer.
 - 1) Moore: Pristine Eco Spec Interior Latex Eggshell, No. 223
 - 2) ICI: LifeMaster 2000 Interior Eggshell, LM9300
 - 3) PPG: Pure Performance Eggshell Interior Latex, 9-411 Series.
 - 4) SW: Harmony® Interior Latex Eg-Shel, B9 Series.
- D. Stained Woodwork: Provide the following stained finishes over new, interior woodwork:
- 1. Waterborne, Satin-Varnish Finish: 2 finish coats of a waterborne, clear-satin varnish over a sealer coat and a waterborne, interior wood stain. Wipe wood filler before applying stain.
 - a. Stain Coat: Waterborne, interior wood stain applied at spreading rate recommended by the manufacturer.
 - 1) ICI: 1700-XXXX Woodpride Interior Oil Finishing Stain.
 - 2) Moore: Benwood Penetrating Stain #234.
 - b. Sealer Coat: Clear sanding sealer applied at spreading rate recommended by the manufacturer.
 - 1) ICI: 1802-0000, Woodpride Interior Waterborne Polyurethane Satin
 - 2) Moore: Moore's Interior Wood Finishes Quick-Dry Sanding Sealer No. 413.
 - c. First and Second Finish Coats: Waterborne, varnish finish applied at spreading rate recommended by the manufacturer.
 - 1) ICI: 1802-0000, Woodpride Interior Waterborne Polyurethane Satin
 - 2) Moore: Benwood Interior Wood Finishes Polyurethane Finishes Low Lustre No. 435.

- E. Ferrous Metal: Provide the following finish systems over ferrous metal:
1. Low VOC, Semigloss, Acrylic-Enamel Finish: One finish coat over an enamel undercoater and a primer.
 - a. Primer: Quick-drying, rust-inhibitive, metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer.
 - 1) ICI: 4020-1000, Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish.
 - 2) Moore: IronClad Latex Low Lustre Metal & Wood Enamel #363.
 - 3) S-W: DTM Acrylic Primer/Finish B66W1 Series.
 - b. Undercoat: Alkyd, interior enamel undercoat or semigloss, acrylic-latex, interior enamel, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer.
 - 1) Moore: IronClad Latex Low Lustre Metal and Wood Enamel, No. 363
 - 2) ICI: Ultra-Hide Aquaacrylic Gripper Stain Killer Primer-Sealer, 3210-1200.
 - 3) S-W: DTM Acrylic Primer/Finish B66W1 Series.
 - c. Finish Coat: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer.
 - 1) Moore: Pristine Acrylic Semi-Gloss, No. 214
 - 2) ICI: LifeMaster 2000 Interior Semi-Gloss, LM9200
 - 3) SW: HealthSpec Low Odor Interior Latex Semi-Gloss, B10 Series.

END OF SECTION

SECTION 10400

SIGNS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of signs:
 - 1. Panel signs.

1.2 SUBMITTALS

- A. Product Data: For each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop Drawings: Show fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details.
 - 1. Provide message list for each sign required, including large-scale details of wording and lettering layout.
- C. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
 - 1. Samples for selection of color, pattern, and texture:

1.3 QUALITY ASSURANCE

- A. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.
- B. Single-Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.
- C. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.
 - 1. Interior Code Signage: Provide signage as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
 - a. Elevator Signs: Refer to Division 14.
 - b. Stairway Identification:
 - c. Signs for Accessible Spaces:
 - 1) Accessible toilet and bathing facilities when not all are accessible.
 - 2. Notify Architect of details or specifications not conforming to code.

- D. Design Concept: The Drawings indicate sizes, profiles, and dimensional requirements of signs and are based on the specific types and models indicated. Sign units by other manufacturers may be considered provided deviations in dimensions and profiles do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Manufacturers of Panel Signs:
 - a. Mohawk Sign Systems.
 - b. Welch Architectural Signage.

2.2 MATERIALS

- A. Cast Acrylic Sheet: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thicknesses indicated, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 deg F (80 deg C), and of the following general types:
 - 1. Opaque Sheet: Where sheet material is indicated as "opaque," provide colored opaque acrylic sheet in colors and finishes as selected from the manufacturer's standards.
- B. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background colors, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for the application intended.

2.3 PANEL SIGNS

- A. Substrate: Fabricate signs from 1/8 inch thick matte clear acrylic with edges mechanically and smoothly finished to eliminate cut marks. Background color to be subsurface.
 - 1. Background Color: As selected by the Architect from manufacturer's standard colors.
 - 2. Edge Condition: Straight.
 - 3. Corner Condition: Rounded to 3/8 inch radius.
 - 4. Size: 6 by 6 inch, unless noted otherwise.
- B. Copy: Helvetica.

- C. Letterform: route copy into face of substrate 1/32 inch deep. Chemically weld (inlay) computer precision cut tactile copy into routed letter openings so that tactile copy is embedded in substrate and remains at least 1/32" above surface of substrate.
 - 1. Height: 5/8 inch minimum letter height.
- D. Braille: Use engrave process for all Braille areas. Engrave Braille dots into surface of clear material.
- E. Symbols of Accessibility:
 - 1. Accessible elements: Provide international symbol of accessibility.
 - a. Provide male and female symbols as required for toilets.
- F. Provide characters complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille.

2.4 FINISHES

- A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's standards.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
 - 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
 - 2. Locate signs in accordance with approved shop drawings and ADA requirements.
- B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
 - 1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.

3.2 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

3.3 PANEL SIGN SCHEDULE

A. Types:	Sizes:	Quantity:
Mens Restrooms	Provide 8" x 6"	one for each room
Womens Restrooms	Provide 8" x 6"	one for each room

Stairs	Provide 6" x 6"	one for each door to stair
Landings	Provide 4" x 4"	one for each landing
Exit	Provide 6" x 6"	one for each exit

END OF SECTION

SECTION 10800

TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Toilet and bath accessories.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.
- B. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.
- D. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.
- B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.
 - 1. Other manufacturers' products with equal characteristics may be considered. See Division 1 Section "Product Requirements."
 - 2. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.4 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.5 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.
 - 1. Minimum Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering accessories that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Toilet and Bath Accessories:
 - a. American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
 - d. Gamco (General Accessory Manufacturing Company)
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Toilet and Bath Accessory Schedule at the end of Part 3.

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
- B. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch (0.9-mm) minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).
- D. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.
- E. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.

- F. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.
- G. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- H. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION

- A. General: One, maximum 1-1/2-inch- (38-mm-) diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of accessories. On interior surface not exposed to view or back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.
- B. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.
- C. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.
- D. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.
- E. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.
 - 1. Provide galvanized steel backing sheet, not less than 0.034 inch (0.85 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- F. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:
 - 1. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
 - 2. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
- G. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.
- C. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 TOILET AND BATH ACCESSORY SCHEDULE

- A. Automatic Paper Towel Dispenser: Where this designation is indicated, provide motion activated paper towel dispenser, battery operated.
 - 1. Products: Available products include the following:
 - a. Kimberly Clark, model H-1184.
 - b. Bradley, model 2490.
 - c. San Jamar, model T1490TBK.
- B. Toilet Tissue Dispenser: Where this designation is indicated, provide toilet tissue dispenser complying with the following:
 - 1. Products: Available products include the following:
 - a. Bobrick No. B-2888.
 - 2. Type: Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
 - 3. Mounting: Surface mounted with concealed anchorage.
 - 4. Material: Stainless steel.
 - 5. Operation: Noncontrol delivery with mfr's standard spindle.
 - 6. Capacity: Designed for 4-1/2- or 5-inch- (114- or 127-mm-) diameter-core tissue rolls.
- C. Grab Bars: Where this designation is indicated, provide stainless-steel grab bar complying with the following:
 - 1. Products: Available products include the following:
 - a. Bobrick No. B-5806 Series.
 - 2. Stainless-Steel Nominal Thickness: Minimum 0.05 inch (1.3 mm).
 - 3. Mounting: Concealed with manufacturer's standard flanges and anchors.
 - 4. Gripping Surfaces: Manufacturer's standard slip-resistant texture.
 - 5. Outside Diameter: 1-1/4 inches (32 mm) for medium-duty applications.
- D. Mirror: Provide mirror as indicated on the drawings. **END OF SECTION**

SECTION 12356

PRE-MANUFACTURED CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Kitchenette cabinets.

1.2 SUBMITTALS

- A. Samples:
 - 1. Wood finish.
 - 2. Finish hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Provide cabinets by one of the following:
 - 1. Armstrong; Premier Construction.

2.2 COLORS, TEXTURES, AND PATTERNS

- A. Colors, Textures, and Patterns: Stain: Honey HO.
- B. Door Style: Branford #007

2.3 CABINET MATERIALS

- A. Exposed Materials:
 - 1. Exposed Wood Species: Hard maple. Do not use two adjacent exposed faces that are noticeably dissimilar in color, grain, figure, or natural character markings.
 - 2. Solid Wood: Clear hardwood lumber of species indicated, free of defects, selected for compatible grain and color, and kiln dried to 7 percent moisture content.
 - 3. Plywood: Hardwood plywood with a minimum of 5-ply veneer core with face veneer of species indicated, selected for compatible color and grain with Grade A faces.
- B. Semiexposed Materials: Unless otherwise indicated, provide one of the following:
 - 1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects and kiln dried to 7 percent moisture content. Stained to be compatible with exposed surfaces.

2. Plywood: Hardwood plywood with a minimum of 5-ply veneer core with Grade C faces stained to be compatible with exposed surfaces.
- C. Concealed Materials:
1. Solid Wood or Plywood: Any hardwood or softwood species, with no defects affecting strength or utility. Hardwood and softwood lumber kiln dried to 7 and 10 percent moisture content, respectively.

2.4 CABINET HARDWARE

- A. Hinges and Drawers: Provide manufacturer's standard for series indicated.
- B. Door and Drawer Pulls: As selected by the Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install casework without variations in plane of adjoining surfaces; use concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match casework face.
- B. Install casework and countertop level and plumb to a tolerance of 1/8 inch in 8 feet.
- C. Fasten cabinets to adjacent units and to backing. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c.
- D. Adjust casework and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

END OF SECTION

SECTION 12356

PRE-MANUFACTURED CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Kitchenette cabinets.

1.2 SUBMITTALS

- A. Samples:
 - 1. Wood finish.
 - 2. Finish hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Provide cabinets by one of the following:
 - 1. Armstrong; Premier Construction.

2.2 COLORS, TEXTURES, AND PATTERNS

- A. Colors, Textures, and Patterns: Stain: Honey HO.
- B. Door Style: Branford #007

2.3 CABINET MATERIALS

- A. Exposed Materials:
 - 1. Exposed Wood Species: Hard maple. Do not use two adjacent exposed faces that are noticeably dissimilar in color, grain, figure, or natural character markings.
 - 2. Solid Wood: Clear hardwood lumber of species indicated, free of defects, selected for compatible grain and color, and kiln dried to 7 percent moisture content.
 - 3. Plywood: Hardwood plywood with a minimum of 5-ply veneer core with face veneer of species indicated, selected for compatible color and grain with Grade A faces.
- B. Semiexposed Materials: Unless otherwise indicated, provide one of the following:
 - 1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects and kiln dried to 7 percent moisture content. Stained to be compatible with exposed surfaces.

2. Plywood: Hardwood plywood with a minimum of 5-ply veneer core with Grade C faces stained to be compatible with exposed surfaces.
- C. Concealed Materials:
1. Solid Wood or Plywood: Any hardwood or softwood species, with no defects affecting strength or utility. Hardwood and softwood lumber kiln dried to 7 and 10 percent moisture content, respectively.

2.4 CABINET HARDWARE

- A. Hinges and Drawers: Provide manufacturer's standard for series indicated.
- B. Door and Drawer Pulls: As selected by the Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install casework without variations in plane of adjoining surfaces; use concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match casework face.
- B. Install casework and countertop level and plumb to a tolerance of 1/8 inch in 8 feet.
- C. Fasten cabinets to adjacent units and to backing. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o.c.
- D. Adjust casework and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

END OF SECTION

SECTION 14240

HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes hydraulic passenger elevators.
- B. Related Sections include the following:
 - 1. Division 3 Section "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
 - 2. Division 4 Section "Unit Masonry" for setting sleeves, inserts, and anchoring devices in masonry.
 - 3. Division 5 Section "Metal Fabrications" for the following:
 - a. Structural-steel shapes for subsills.
 - b. Pit ladders.
 - 4. Division 13 Sections for smoke detectors in elevator lobbies to initiate emergency recall operation and heat detectors in shafts and machine rooms to disconnect power from elevator equipment before sprinkler activation and for connection to elevator controllers.
 - 5. Division 16 Sections for telephone service to elevators.
 - 6. Division 16 Sections for electrical service for elevators to and including fused disconnect switches at machine room door.
- C. Refer to Division 1 Section "Allowances" for information on custom cab finishes. Elevator contractor is to provide a finished cab with finishes as indicated in this section. General contractor is to carry an allowance to upgrade finishes.

1.2 DEFINITIONS

- A. Defective Elevator Work: Operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

1.3 SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
- B. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment and signals. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.

- C. Samples: For exposed finishes of cars, hoistway doors and frames, and signal equipment; 3-inch- (75-mm-) square samples of sheet materials; and 4-inch (100-mm) lengths of running trim members.
- D. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.
- E. Maintenance Manuals: Include operation and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information. Include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. Submit for Owner's information at Project closeout as specified in Division 1.
- F. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an experienced installer approved by elevator manufacturer who has completed elevator installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Regulatory Requirements: In addition to local governing regulations, comply with applicable provisions in ASME A17.1, "Safety Code for Elevators and Escalators."
 - 1. Seismic Risk Zone: Project is located in Zone 2.
- C. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.
- D. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.
 - 1. Elevators: Provide elevators as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
 - a. Automatic Operation: Provide self-leveling feature.
 - b. Hall Call Buttons:
 - 1) Center height at 42 inches (1065 mm) above the floor.
 - 2) Provide not less than 3/4 (19 mm) inch diameter button. Place button designating the up direction on top.
 - c. Hall Lanterns: Provide a visible and audible signal at each hoistway entrance to indicate which car is answering a call.
 - 1) Sound audible signal once for the up direction and twice for the down direction.
 - 2) Visible Signals:
 - a) Mount fixture with centerline not less than 72 inches (1830 mm) above the floor.
 - b) Provide smallest dimension of the visual element not less than 2-1/2 inches (64 mm).
 - c) Locate signals so they are visible from the vicinity of the hall call buttons.

- d. Raised and Braille Characters on Hoistway Entrances:
 - 1) Provide raised and braille floor designations on both door jambs.
 - 2) Mount centerline of designations at 60 inches (1525 mm) above the floor.
 - 3) Provide designations that meet the requirements of signage.
 - e. Door Protective and Reopening Device:
 - 1) Provide automatic opening and closing of doors.
 - 2) Provide reopening device that will stop and reopen a car door and hoistway door automatically if the door becomes obstructed by an object or person.
 - a) Provide a device capable of completing these operations without requiring contact for a obstruction passing through the opening at heights of 5 and 29 inches (125 and 735 mm) above finish floor.
 - b) Door reopening devices shall remain effective for at least 20 seconds.
 - f. Door and Signal Timing for Hall Calls: Not less than 5 seconds.
 - g. Door Delay for Car Calls: The minimum time for elevator doors to remain fully open in response to a car call shall be 3 seconds.
 - h. Illumination Levels: Not less than 5 footcandles.
 - i. Car Controls:
 - 1) Buttons: Provide not less than 3/4 (19 mm) inch diameter button.
 - 2) Tactile, Braille and visual Control Indicators: Provide raised and braille characters and numerals.
 - a) Provide a raised star at the left of the floor designation for the main entry floor.
 - b) Locate raised designations to the left of the button to which they apply.
 - c) Provide floor buttons with visual indicators to show when each call is registered. Extinguish the visual indicator when each call is answered.
 - 3) Height: Not higher than 54 inches (1370 mm) above the finish floor. For side approach and 48 inches (1220 mm) for front approach.
 - a) Group emergency controls, including the emergency alarm and emergency stop at the bottom of the panel and locate centerlines not less than 35 inches (890 mm) above the finish floor.
 - j. Car Position Indicators: Provide a visual car indicator above the car control panel or over the door to show the position of the elevator in the hoistway. Illuminate the corresponding numerals and sound an audible signal as the car passes or stops at a floor.
 - 1) Provide numerals not less than 1/2 inch (13 mm) high.
 - 2) Provide an audible signal of not less than 20 decibels with a frequency no higher than 1500 Hz.
 - k. Emergency Communications: Provide emergency two-way communication between the elevator and a point outside the hoistway.
 - 1) Locate the operable part of communication device not less than 48 inches (1220 mm) above the finish floor of the car.
 - 2) Identify device with raised symbol and lettering.
 - 3) If the system uses a handset, then provide a cord from the panel to the handset not less than 29 inches (735 mm) long.
2. Notify Architect of details or specifications not conforming to code.
- E. The elevator installation shall be a design that can be maintainable by any licensed elevator maintenance company employing journeymen mechanics, without the need to purchase or lease additional diagnostic devices, special tools, or instructions from the original equipment manufacturer.

- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Management and Coordination."

1.5 COORDINATION

- A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.
- B. Furnish well casing and coordinate delivery with related excavation work.
- C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.
- D. Coordinate size of elevator pit with manufacturer selected. Provide any necessary revisions to pit or shaft size at no additional cost to the Owner.

1.6 WARRANTY

- A. Special Manufacturer's Warranty: Written warranty, signed by manufacturer agreeing to repair, restore, or replace defective elevator work within specified warranty period.
 - 1. Warranty Period: 12 months from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance service by skilled employees of the elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Provide parts and supplies as used in the manufacture and installation of original equipment.
 - 1. Perform maintenance, including emergency callback service, during normal working hours.
 - 2. Include 24-hour-per-day, 7-day-per-week emergency callback service.
 - a. Response Time: Two hours or less.
- B. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering hydraulic elevators that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Canton Elevator Co.
 - 2. Otis Elevator Co.
 - 3. ThyssenKrupp Elevator.

2.2 MATERIALS AND COMPONENTS

- A. General: Provide manufacturer's standard elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard preengineered elevator systems and as required for a complete system.
- B. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations. Provide either of the following:
 - 1. Submersible pump, with submersible squirrel-cage induction motor, suspended inside tank from vibration isolation mounts.
 - 2. Provide motor with solid-state starting.
 - 3. Provide motor with circuit requirements to match indicated power circuits provided or include cost for revisions to electrical design.
 - 4. Provide variable-voltage variable-frequency motor control.
- C. Hydraulic Silencers: Provide hydraulic silencer containing pulsation-absorbing material in a blowout-proof housing at pump unit.
- D. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide flexible connectors to minimize sound and vibration transmissions from power unit.
 - 1. Provide dielectric couplings at plunger/cylinder units.
 - 2. Casing for Underground Piping: PVC pipe complying with ASTM D 1785 joined with PVC fittings complying with ASTM D 2466 and solvent cement complying with ASTM D 2564.
- E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work where installation of devices is specified in another Specification Section.
- F. Protective Cylinder Casings: Schedule 40 PVC pipe casings complying with ASME A17.1, of sufficient size to provide not less than 1-inch (25-mm) clearance from cylinder, and extending above pit floor.
- G. Guide Rails: Manufacturer's standard, selected for loads and for full height span between support locations indicated by building structural design.
- H. Car Frame and Platform: Welded steel units.
- I. Finish Materials: Provide the following materials and finishes for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated:
 - 1. Satin Stainless Steel: ASTM A 666, Type 304, with No. 4, directional satin finish.
 - 2. Enameled-Steel Sheet: Cold-rolled steel sheet complying with ASTM A 366/A 366M, matte finish, stretcher-leveled standard of flatness; hot-rolled steel sheet complying with ASTM A 569/A 569M may be used for door frames. Provide with factory-applied enamel finish; colors as selected by Architect.

3. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS for flat applications; color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range of products.

2.3 OPERATION SYSTEMS

- A. Passenger Elevators: Provide manufacturer's standard microprocessor operation system for each elevator or group of elevators as required to provide type of operation system indicated.
 1. Single Elevator: Provide "selective collective automatic operation" as defined in ASME A17.1.
- B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated.
 1. Independent Service: Keyswitch in car control station removes car from group operation and allows it to respond only to car calls. Key cannot be removed from keyswitch when car is in independent service. When in independent service, doors close only in response to the door close button.

2.4 SIGNAL EQUIPMENT

- A. General: Provide signal equipment for each elevator or group of elevators with hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements of acrylic or other permanent, nonyellowing translucent plastic.
- B. Car Control Stations: Provide manufacturer's standard semirecessed car control stations. Mount in return panel adjacent to car door, if not otherwise indicated.
 1. Include call buttons for each landing served and other buttons, switches, and controls required for specified car operation.
 2. Mark buttons and switches with manufacturer's standard identification for required use or function that complies with ASME A17.1.
 3. Mount controls at heights complying with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."
- C. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)." On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- D. Car Position Indicator: For passenger elevator cars, provide illuminated-signal type, digital-display type, or segmented type, located above car door or above car control station. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
 1. Include travel direction arrows if not provided in car control station.

- E. Hall Push-Button Stations: Provide one hall push-button station at each landing for each elevator or group of elevators, but not less than one station for each four elevators in a group. For each group of passenger elevators, locate between two elevators at center of group or at location most convenient for approaching passengers.
 - 1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
- F. Hall Lanterns: Provide units with illuminated arrows, but provide single arrow at terminal landings.
 - 1. Place lanterns either above or beside each hoistway entrance, unless otherwise indicated. Mount at a minimum of 72 inches (1829 mm) above finished floor.
 - 2. With each lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
 - a. At manufacturer's option, audible signals may be placed on each car.
- G. Hall Position Indicators: Provide illuminated-signal type or digital-display type, located above each hoistway entrance at ground floor. Provide units with flat faceplate for mounting with body of unit recessed in wall.
 - 1. Integrate ground-floor hall lanterns with hall position indicators.
- H. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations with text and graphics according to ASME A17.1, Appendix H.

2.5 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door reopening devices with a uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams shall cause doors to stop and reopen.

2.6 PASSENGER ELEVATOR CAR ENCLOSURES

- A. General: Provide manufacturer's standard steel-framed car enclosures with nonremovable wall panels, suspended ceiling, trim, accessories, access doors, doors, power door operators, sills (thresholds), lighting, and ventilation.
 - 1. Floor finish is specified in another Section.
 - 2. Plastic Laminate Wall Panels: Plastic laminate adhesively applied to ½-inch (13-mm) fire-retardant-treated particleboard with manufacturer's standard protective edge trim. Panels have a flame-spread rating of 25 or less, when tested according to ASTM E 84."
 - 3. Fabricate car with recesses and cutouts for signal equipment.
 - 4. Fabricate car door frame integrally with front wall of car.
 - 5. Stainless-Steel Doors: Flush, hollow-metal construction, fabricated from stainless steel.
 - 6. Sills: Extruded metal, with grooved surface, 1/4 inch (6.4 mm) thick. Provide polished finish.
 - 7. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic complying with flammability requirements.
 - 8. Handrails: Manufacturer's standard handrails, of metal indicated, to be installed after cab finishes.

2.7 PASSENGER HOISTWAY ENTRANCES

- A. General: Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Provide frame size and profile to coordinate with hoistway wall construction.
- B. Materials and Fabrication: Provide manufacturer's standards but not less than the following:
 - 1. Stainless-Steel Frames: Formed stainless-steel sheet.
 - 2. Stainless-Steel Doors: Flush, hollow-metal construction, fabricated from stainless steel.
 - 3. Sills: Extruded metal, with grooved surface, 1/4 inch (6.4 mm) thick. Provide polished finish.
 - 4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

2.8 PASSENGER ELEVATORS

- A. Elevator:
 - 1. Type: Under-the-car single cylinder.
 - 2. Rated Load: 2000 lb (908 kg).
 - 3. Rated Speed: 125 fpm (0.64 m/s)
 - 4. Number of Stops: 4
 - 5. Front Openings: 4
 - 6. Rear Openings: 2
 - 7. Operation System: Selective collective automatic operation.
 - 8. Auxiliary Operations:
 - a. Independent service.
 - 9. Car Enclosures: As follows:
 - a. Inside Width: Manufacturers standard.
 - b. Inside Depth: Manufacturers standard.
 - c. Inside Height: Manufacturers standard.
 - d. Front Walls: Satin stainless steel with integral car door frames.
 - e. Car Fixtures: Satin stainless steel.
 - f. Side and Rear Wall Panels: By other through Allowance.
 - g. Door Faces (Interior): Satin stainless steel.
 - h. Door Sills: Aluminum.
 - i. Ceiling: Luminous ceiling.
 - j. Handrails: Satin stainless steel, at side and rear walls.
 - 10. Hoistway Entrances: As follows:
 - a. Width: 36 inches (914 mm).
 - b. Height: 84 inches (2134 mm).
 - c. Type: Single-speed side sliding.
 - d. Frames: Satin stainless steel.
 - e. Doors: Satin stainless steel.
 - f. Sills: Aluminum.
 - 11. Hall Fixtures: Satin stainless steel.
 - 12. Additional Requirements: As follows:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
 - b. Provide protective blanket hooks in car and one complete set of full-height blankets.
 - 13. Electrical Requirements:
 - a. 40 hp.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Verify critical dimensions, and examine supporting structure and other conditions under which elevator work is to be installed. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Excavation for Jack: Drill excavation in each elevator pit to accommodate installation of cylinders; comply with applicable requirements in Division 2 Section "Earthwork."
 - 1. Provide well casings as necessary to retain walls of well hole.
- B. Install cylinders in protective casings within well hole or casing. Before installing protective casing, remove water and debris from well hole or casing. Fill void space between protective casing and cylinder with fine sand.
 - 1. Align cylinders and fill space between well casing and protective casing with fine sand.
- C. Jack Protection:
 - 1. Prior to insertion of the jack unit in the jack hole, a recognized brand of corrosion-resisting tape shall be applied to the jack casing.
 - 2. This tape shall be spirally applied with a minimum overlap of 2".
 - 3. Special care shall be exercised until the jack is set to minimize damage to the tape.
- D. Install cylinders plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor. Seal between protective casing and pit floor with 4 inches (100 mm) of nonshrink, nonmetallic grout.
 - 1. Provide waterstop collar on the outside of the earth casing to seal the casing to the pit floor.
 - 2. Provide waterstop collar to seal between the earth casing and the jack unit.
- E. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
- F. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system.
- G. Install piping above the floor, where possible. Where not possible, install underground piping in Schedule 40 PVC pipe casing assembled with solvent-cement fittings.
- H. Lubricate operating parts of systems as recommended by manufacturers.
- I. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

- J. Leveling Tolerance: 1/4 inch (6 mm), up or down, regardless of load and direction of travel.
- K. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.

3.4 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure and other building emergencies. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.
- B. Make a final check of each elevator operation with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

3.5 PROTECTION

- A. Temporary Use: Do not use elevators for construction purposes unless cars are provided with temporary enclosures, either within finished cars or in place of finished cars, to protect finishes from damage.
 - 1. Provide full maintenance service by skilled, competent employees of elevator Installer for elevators used for construction purposes. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Use same parts and supplies as used in the manufacture and installation of original equipment.
 - 2. Provide protective coverings, barriers, devices, signs, and other procedures to protect elevators. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

END OF SECTION

SECTION 15400

PLUMBING

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work covered by this Section of the Minimum Standards includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to design and install a complete and functional plumbing systems.

1.2 GENERAL REQUIREMENTS

- A. The provisions of 15000 "Supplemental Mechanical General Requirements" are made a part of this section.
- B. Substitutions: Your attention is directed to Section 15000 relative to competition and the (ONLY) notation. Familiarity with this section should be achieved before reading the PRODUCTS section of this specification.
- C. Coordinate with all trades and Architect/Engineer.

1.3 SUBMITTALS

- A. The items for which the shop drawings paragraph 1.12 in Section 15000 "Supplemental Mechanical General Requirements", apply are as follows:
 - 1. Plumbing fixtures, traps, and trimmings.
 - 2. Valves and valve devices, shock suppressors, relief valves, and pressure reducing valves.
 - 3. Pipe materials and hangers.
 - 4. Insulation materials.
 - 5. Cleanouts.
 - 6. Plumbing system design calculations.

PART 2 PLUMBING SYSTEM DESIGN

2.1 REQUIRED FACILITIES

- A. Minimum Required Facilities:
 - 1. Provide men's and women's toilet(s) as indicated on the architectural drawings. Number of water closets and lavatories per washroom shall be as defined by the Maine State Plumbing Code

and the architectural drawings. At least one water closet and lavatory in each bathroom shall be ADA compliant.

2. Provide mop basins and faucets at Janitor's Closet(s) as indicated on architectural drawings.
3. Stub 4" sanitary line from sanitary exit point out to exterior wall on side towards future expansion area.

B. Plumbing Systems:

1. Provide a gravity sanitary waste, drain and vent system in accordance with the Maine State Plumbing Code and IBC. Coordinate location of sanitary exit with site plan. Coordinate vent piping roof penetrations with architectural drawings and outside air intakes.
2. Provide a hot and cold potable water system for the office area only in accordance with the Maine State Plumbing Code. Provide minimum flow and pressure at each fixture per manufacturer's recommendations. For fixtures without manufacturer's recommendations provide minimum flow and pressure as defined in the IBC Plumbing Code. Sizing of domestic water piping shall conform to the Maine State Plumbing Code.
3. Provide an electric water heater with a combined instantaneous recovery rate and storage tank volume designed to service the buildings peak hourly load. Hot water system shall have the capacity to be generated at 120°F.
4. Provide water hammer arrestors on the domestic water piping in accordance with IBC Plumbing Code and Plumbing and Drainage Institute Std. PDI-WH201.
5. Provide a Natural Gas piping to the rooftop equipment. Coordinate with Rob Mitchell @ HVAC Services for loads and locations of equipment.
9. Rough-in and make final connections to fixtures and equipment. Provide stop valves in the hot, cold and gas supplies to each fixture/item of equipment.

PART 3 PRODUCTS

3.1 FIXTURES AND TRIM

- A. ADA Water Closet: Eljer "Patriot", 1.6 gpf, floor mount, tank type, elongated bowl, Church open front seat, with cover. Seat height shall be 17"-19" above finished floor.
- B. ADA Lavatory: Eljer "Blair", wall hung, vitreous china, 20"x18", 4" centers. Faucet Fitting: Symmons Symmetric S-20-2 faucet with grid strainer, .5 GPM aerator, vandal-resistant, single handle.
- C. Mop Basin: Fiat #MSB-2424 molded stone, white, with cast brass drain body, dome strainer, service faucet #830-AA with vacuum breaker and integral stops, hose and hose bracket #832-AA. Provide Model 889-CC mop hanger and #MSG2424 stainless steel wall guard.

3.2 MISCELLANEOUS EQUIPMENT

- A. Water Hammer Arrestor: Jay R. Smith, or Zurn, sized in accordance with Plumbing Drainage Institute PDI-WH201.

Size #100 PDI - "A" 0 - 11 F.U.

Size #200 PDI - "B" 12 - 32 F.U.

Size #300 PDI - "C" 33 - 60 F.U.

- B. Cleanouts (Floor): Zurn Z-1400 with membrane flange and clamping collar. Provide cover compatible with floor finish.
- C. Solder: Harris Stay-Safe 50 lead-free (ONLY).

3.3 PIPING MATERIALS

- A. Soil, Waste, Vent and Roof Drain Piping: PVC below grade and above grade. Vent piping PVC.
- B. Hot and Cold Water Piping: CPVC or Type L hard copper tubing and cast bronze or wrought copper solder fittings above grade. Below grade branch piping Type K soft copper in PVC conduit or PEX tubing. Electrically heat trace piping in areas subject to freezing with self-regulating heat trace.
- D. Exposed Water and Waste Piping at Fixtures: I.P.S. copper with cast brass fittings all chrome plated finish, with deep one piece escutcheon plates at traverse points.
- E. Gas Piping: Schedule 40 carbon steel pipe conforming to ASTM A53, with threaded joints and malleable iron fittings above grade. Paint Yellow.

3.4 VALVES

- A. Ball Valves - Water Service: Apollo.
 - 1. 3/8" through 2" copper, Model 70-202 through 208.
- B. Ball Valves - Gas Service: Apollo.
 - 1. 1/2" through 3" threaded, Model 80-100 through 110.
- C. Check Valves: Nibco.
 - 1. 1/2" through 2" copper, Model S-413.
 - 2. 1/2" through 2" IPS, Model T-413.

3.5 INSULATION MATERIALS

- A. Hot Water and Cold Water Piping: Heavy density fiberglass with thermal conductivity of 0.29 BTU-in/hr-ft²-°F at 150°F mean temperature. Insulation shall be suitable for 400°F service. Pipe fitting insulation shall be same material used for pipe.
- B. Insulation Jacket: All service (ASJ) type, with maximum flame spread of 25, fuel contribution of 50 and smoke developed of 50 (ASTM E84). Jacket permeability shall not exceed 0.02 perms (ASTM E96). Pipe fitting jacket shall be molded PVC covers with pressure sensitive taped joints.

3.6 PIPE HANGERS

- A. Adjustable Swivel Hanger: Carpenter and Paterson Fig. 800 for steel pipe and Fig. 800 CT for copper tubing.
- B. Riser Clamp: Carpenter and Paterson Fig. 126 for steel pipe and Fig. 126 CT for copper tube.
- C. Insulation Shields (saddles): Galvanized steel.

PART 4 EXECUTION

4.1 DESIGN AND INSTALLATION OF PIPING SYSTEM

- A. Design, provide and erect, in accordance with the best practice of the trade, piping system required to complete the intended installation. Make such offsets required to place piping in proper position, to avoid other work, and to allow the application of insulation and finish painting to the satisfaction of the Owner.

- B. The size and general arrangements, as well as the methods of connecting piping, valves, and equipment, shall be as designed or as indicated, to meet the requirements of the Owner.
- C. Piping system shall be designed and erected so as to provide for the easy and noiseless passage of fluids under working conditions.
- D. Piping shall be run concealed above ceilings in occupied areas.
- E. Install stop valves and unions to facilitate removal and servicing of equipment.
- F. Connections between copper and steel piping shall be made with brass fittings.
- G. Solder joints shall be made with lead free (ONLY) solder. Clean surfaces to be soldered and use a paste flux. Wash joints with sodium bicarbonate and water to remove corrosive effects of heated solder paste.
- H. Points of traverse of piping through walls and floors shall be through PVC sleeves. Sleeves shall be of the next clearance size. Traverse points of piping shall be escutcheoned with split chrome floor and ceiling plates and spring anchors, where visible to occupancy.

4.2 PIPE HANGERS

- A. Impact driven studs are prohibited.
- B. Cast Iron Pipe: supported at intervals as follows, with rod sizes as follows, double nuts on hanger and on beam clips.

<u>Cast Iron Pipe</u>	<u>Hanger Intervals</u>	<u>Rod Sizes</u>
1-1/2"	5'	3/8"
2"	5'	3/8"
2-1/2"	5'	1/2"
3"	6'	1/2"
4"	7'	5/8"

- C. Copper Tubing: Supported at intervals as follows, rod sizes as follows, double nuts on hangers and on beam clips.

<u>Size</u>	<u>Hanger Intervals</u>	<u>Rod Sizes</u>
1/2"	7'	3/8"
3/4"	7'	3/8"
1"	8'	3/8"
1-1/4"	8'	3/8"
1-1/2"	10'	3/8"
2"	10'	3/8"

- D. Steel Pipe: Supported at intervals and with rod sizes as follows, double nuts on hanger and on beam clips.

<u>Size</u>	<u>Hanger Intervals</u>	<u>Rod Sizes</u>
1/2"	7'	3/8"
3/4"	7'	3/8"
1"	7'	3/8"
1-1/4"	7'	3/8"
1-1/2"	7'	3/8"
2"	8'	3/8"
2-1/2"	10'	1/2"
3"	12'	1/2"

- E. PVC Pipe: Supported at 3 foot intervals.
- F. Verticals: supported at not more than 16. ft. intervals by use of clamp hangers. Cast iron risers: supported at the base of the stack.

4.3 INSULATION OF PIPING

- A. Insulate domestic hot water and cold water, valves and fittings. Fittings shall be mitered fiberglass insulation segments of same thickness as adjacent insulation. Fitting and valve body insulation shall be covered with molded PVC fitting covers. Secure overlap at cover throat with stainless steel tacks. Tape joints with pressure sensitive vapor barrier tape.
- B. Hangers: Provide insulation shield for hangers.

C. Unions shall be covered as are fittings but shall have collared enlargement at least 1" larger than the OD of the line insulation.

D. Insulation Thickness:

1. Hot water piping: up to 1" diameter - 1/2" thick insulation.

2. Cold water and condensate piping: 1/2" thick insulation.

4.4 CLOSING IN UNINSPECTED WORK

A. General: Cover up or enclose work after it has been properly and completely inspected and favorably reviewed.

B. If any of the work is covered or enclosed prior to required inspections and acceptance, uncover the work as required for the test and inspection. After inspection, tests and acceptance, repairs and replacements shall be made by the appropriate trades with such materials as necessary for the acceptance by the Owner and at no additional cost to the Owner.

4.5 CLEANUP AND CORROSION PREVENTION

A. Upon completion of the work thoroughly clean and flush piping systems to the sewer with water.

B. Fixtures, piping and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.

C. Caulk around fixtures at floor and wall.

D. Before covering is applied to piping systems, clips, rods, clevises and other hanger attachments, and before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces. When corrosion is from the effects of hot solder paste, the areas shall be cleaned and polished and a wash of bicarbonate of soda and water used to neutralize the acid condition.

4.6 DISINFECTING

A. After the entire potable water system is completed, cleaned and tested, and just before the building is ready to be occupied, disinfect the system as follows: After flushing the mains, introduce a water and chlorine solution for a period of not less than three hours before final flushing of the system.

4.7 TESTS

- A. Sanitary Soil, Waste, and Vent Piping: Filled with water to top of vents, and tested as required by Code.
- B. Water Piping: Tested to a pressure of 100 lbs., per square inch for at least 30 minutes. Pressure drop in this period not to exceed two pounds per square inch. Leaks shall be repaired and system retested. Notify Owner 24 hours before test is to be performed.
- C. Gas Piping: Test to 3 psig with an inert gas, and joints tested for leaks with a leak detector in accordance with NFPA 54.

4.8 INSTRUCTIONS

- A. On completion of the project, provide a 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.

4.9 FIRESTOPPING

- A. Firestopping shall be performed in accordance with Specification Section Firestopping. All penetrations of fire-rated assemblies including walls and floors by mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified. Coordinate size, location and type of pipe and duct sleeves as required by firestopping systems.

END OF SECTION

SECTION 15500

AUTOMATIC FIRE PROTECTION SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to design, install and test a pressurized, fully supervised, wet pipe fire protection system for full building protection in accordance with NFPA, IBC, and the Owner's insurance underwriter. Areas subject to freezing, such as the attic, shall have a dry pipe system. Exterior overhangs shall have dry pendent or sidewall heads, or glycol-and-water loop per NFPA.

1.2 RELATED DOCUMENTS

- A. The drawings and the specifications including SECTION 15000 "SUPPLEMENTAL MECHANICAL GENERAL REQUIREMENTS" are hereby made a part of the work of this section.

1.3 QUALIFICATIONS

- A. The Fire Protection Work shall be performed by a qualified Contractor primarily engaged in the design and installation of Fire Protection Systems. The fire protection system design shall be performed under the direction of, and sealed by, a professional engineer registered in the State of Maine.
- B. Welding qualifications of individuals installing welded piping shall be certified by the National Certified Welding Bureau for the type(s) of weld(s) proposed for use in piping assembly.

1.4 SUBMITTALS

- A. Items for which the submittal requirements of section 15000, Supplemental Mechanical General Requirements, apply are as Follows:
 - 1. Hydrant flow test.
 - 2. System components.
 - 3. Hydraulic calculations.
 - 4. Piping layout, details and control diagram.
 - 5. Flushing and testing records.
 - 6. Certificate of installation.
 - 7. Copy of Fire Protection Contractors License.
 - 8. Welding certificates of individual welding technicians.
 - 9. Zone flow switches and valves.
 - 10. Sprinkler heads.

11. Alarm valve(s).
12. Fire department connection(s).
13. Firestopping materials and methods.

Submit hydrant flow test, equipment descriptive data, hydraulic calculations and system layout for review by the Owner's Insurance Underwriter, State Fire Marshall's office, Portland Fire Department and Architect/Engineer. The Architect's review will be limited to checking for conformance with the design concept of the project and general compliance with the contract documents and will in no way assume liability for review for compliance with codes, standards and laws.

1.5 SPRINKLER COVERAGE

- A. Sprinkler head coverage shall conform with NFPA requirements for the use of the building (0.10 GPM/SF density for the hydraulically most remote 1500 S.F.). Coverage shall be increased accordingly where required by the Authority having jurisdiction.
- B. If the requirements of the inspection agency or the Owner's insuring agent are more rigorous than those stated herein, then the more rigorous requirements shall govern.

PART 2 PRODUCTS

2.1 SYSTEM COMPONENTS AND HARDWARE

- A. Pipe, Fittings, Joints, Hangers, Valves, Fire Department Connections, Alarms: Conform to NFPA-13, Installation of Sprinkler Systems and NFPA 14 Standpipes. Contractor shall obtain up-to-date water flow and pressure data prior to any calculations.
- B. Sprinkler Heads:
 1. Interior Heated Spaces: Conform to NFPA-13, commercial quick response type. Provide semi-recessed type with white finish for acoustical tile ceilings, center head in tile where possible. Sprinkler heads in GWB ceilings shall be concealed type, white finish. Dry pendent or sidewall heads, where required, may be standard response type, white finish.
 2. Provide a spare head cabinet with wrenches and six (6) heads of each orifice size, finish, temperature classification, pattern and length furnished in the project.
 3. Sprinkler heads in unheated areas shall be dry pendent or sidewall type, or served by a glycol and water loop or separate dry-pipe system.

4. Temperature ratings for sprinkler heads shall be suitable for the space. Heads in boiler rooms and similar locations with concentrated heat sources shall have heads with the appropriate temperature rating.
- C. Fire Department Connection: Provide a 4" Storz or Siamese connection (verify type with the Portland Fire Department) at a location coordinated with the local fire department and the Architect.
- D. Post Indicator Valves: Gate valves for uses with indicator post shall conform to UL 262. Indicator posts shall conform to UL 789. Provide indicator post with one coat of primer and two coats of red enamel paint.
- E. Valve Boxes: Except where indicator posts are provided, provide each gate valve in buried piping with an adjustable cast-iron valve box of a size suitable for the valve on which it is to be used. Boxes outside of paved areas may be of Acrylonitrile-Butadiene-Styrene (ABS) plastic or of inorganic fiber reinforced black polyolefin plastic. The head shall be round and the lid shall have the word WATER cast on it. The least diameter of the shaft of the box shall be 5.25 inches. Provide each cast-iron box with a heavy coat of bituminous paint.

2.2 WATER SUPPLIES

- A. Conform to the requirements of NFPA-13 & NFPA 14, Installation of Sprinkler Systems.
- B. Contractor shall obtain up-to-date water flow and pressure data.

2.3 DEVICES

- A. Detection devices and associated wiring both within the fire protection system and to the building Fire Alarm System shall be the responsibility of the Sprinkler Contractor.

2.4 BACKFLOW PREVENTER

- A. Provide AMES MODEL 2000.

2.5 PIPING SYSTEM IDENTIFICATION

- A. Piping system and valve identification and color coding shall be in accordance with ANSI.

2.6 SPRINKLER SYSTEM ZONING

- A. Zoning at a minimum shall be per tenant, but shall be verified by Owner and authority having jurisdiction (AHJ). Each zone alarm shall consist of a flow switch, isolation valve with tamper switch and other components per NFPA and connect to the building fire alarm panel. See Architectural Drawings for additional information.

2.7 CEILING CAVITIES

- A. Ceiling cavities above all suspended acoustical tile ceilings in corridor areas and certain other areas contain bundled electrical cables and individual wires and shall be sprinklered. Coordinate sprinkler requirements with the Electrical Contractor.

PART 3 EXECUTION

3.1 PIPING LAYOUT AND DESIGN

- A. System requirements, installation requirements, design, plans, and calculations: Conform to NFPA-13, Installation of Sprinkler Systems & NFPA 14 Standpipes.
- B. Sprinkler piping shall be run concealed above ceilings in occupied areas. Piping in other areas may be run exposed. Piping shall not be exposed in occupied spaces unless indicated on the drawings.
- C. Pipe penetrations through walls and floors shall be in accordance with Section 15000 - Additional General Mechanical Requirements. Traverse points of piping shall be escutcheoned with split chrome (white finish) floor and ceiling plates and spring anchors, where visible to occupancy. All penetrations shall be sleeved and firestopped.
- D. Coordinate design and layout with building structure and building systems. The work shown in the contract documents has precedence for space requirements. Work of other trades may be modified or moved only with permission of the trade involved. Costs associated with modifications or relocations shall be the same as for "Substitutions" Section 15000. Sprinkler system piping may need to be located within the structural system in certain locations.
- E. Architect shall review proposed system layout and reserve the right to relocate heads, substitute head system and in general review final layout for components visible in occupied spaces.

3.2 SYSTEM ACCEPTANCE

- A. Approval, flushing, hydrostatic testing, instructions, and certificates of installation: Conform to NFPA-13, Installation of Sprinkler Systems & NFPA 14 Standpipes.
- B. Disinfect the water piping in accordance with AWWA C601. Fill the piping systems with solution containing a minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Repeat disinfection if chlorine residual is less than 10 parts per million after 24 hours. Flush the solution from the systems with clean water until maximum residual chlorine contents is not greater than 0.2 parts per million.
- C. Closing in Work:
 - 1. General: Cover up or enclose work after it has been properly and completely reviewed.
 - 2. No additional cost to the Owner will be allowed for uncovering and recovering, work that is covered or enclosed prior to required review and acceptance.
- D. Cleanup and Corrosion Prevention:
 - 1. Upon completion of the work thoroughly clean and flush piping systems to the sewer with water.
 - 2. Piping and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.
 - 3. Before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces. When corrosion is from the effects of hot solder paste, the areas shall be cleaned and polished and a wash of bicarbonate of soda and water used to neutralize the acid condition.
- E. Instructions: On completion of the project, provide a technician familiar with the system to thoroughly instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed four (4) hours. The time of instruction shall be arranged with the Owner.
- F. Warranty: For a period of one (1) year after completion of the installation repair or replace any defective materials or workmanship. Upon completion of the installation, the system shall be turned over to the Owner fully inspected and tested, and in operational condition.

3.3 FIRESTOPPING

- A. Firestopping shall be performed in accordance with Applicable Codes. All penetrations of fire-rated assemblies including walls and floors by mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified.

* END OF SECTION *

SECTION 16000
ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

- A. The electrical system design and installation shall be performed by a electrical design-build contractor, hereinafter referred to as the Contractor.
- B. The electrical work shall include but not be limited to the following:
 - 1. Design build electrical contractor is responsible for analyzing existing service size and condition of equipment to see if it is sufficient to serve the new tenant space build out. The new tenant space on the upper floors will include new rooftop HVAC equipment and elevator. Contractor responsible for submitting drawing(s) of service electrical design for review and approval by Bennett Engineering prior to installation.
 - 2. Complete power distribution system. Contractor shall provide engineered stamped drawings for City permitting.
 - 3. Complete addressable fire alarm system through out the entire building including all existing occupied spaces, sprinkler system and new elevator. See architectural drawings for building floor plans.
 - 4. Interior lighting system for the new tenant spaces including exit and emergency lighting.
 - 5. Mechanical HVAC equipment serving the new tenant spaces gas fired rooftop units, bathroom exhaust fans, electric water heater (s) and any other not listed. Coordinate with Rob Mitchell @ HVAC Services prior to Bid.
- C. Incoming telephone service cables and interface shall be coordinated with the Telephone Company.

1.02 WORKING DRAWINGS

- A. Provide working drawings indicating the location and arrangement of the increments of the systems of this section of work.

- B. The drawings shall show sufficient detail to allow coordination between trades, and to provide the Architect/engineer with documents suitable for a quality assurance review. Include with the drawings, manufacturer's data of the electrical devices, fixtures, equipment and systems.
- C. Drawings, specifications and calculations shall be prepared, stamped and signed by a Professional Engineer registered in the State of Maine and shall comply with the minimum standards as hereinafter specified.
- D. The design shall be in accordance with the current National Electrical Code, BOCA, NEMA, ANSI, NFPA, and other applicable codes and standards.
- E. Provide drawings for State Fire Marshall and Portland Fire Department approval.

1.03 STANDARDS

- A. Materials, equipment and installation shall comply with the following:
 - 1. 2005 National Electrical Code.
 - 2. Any Federal, State and/or local codes, applicable ordinances and regulations.
 - 3. Latest approved standards of IEEE, ANSI, NEMA, NFPA, OSHA, ADA, UL.
 - 4. Utility company requirements and telephone company requirements.
 - 5. The Norway Fire Department.
 - 6. The Norway Police Department.
 - 7. The monitoring company selected by the Owner.
- B. Electrical equipment shall be UL listed.

1.04 MATERIALS AND LABOR

- A. Furnish materials and labor necessary to deliver to the Owner a complete and operable system.
- B. Materials shall be of the best quality. Workmanship shall be of the highest grade and construction shall be done according to the best practices of the trade.

1.05 CODES, PERMITS, INSPECTIONS

- A. The installation shall comply with laws and regulations applying to the electrical installation in effect at the site with regulations of any other governmental body of agency having jurisdiction, and with regulations of the National Electric Code 2006 (NEC).

- B. Obtain and pay for permits required by the ordinances at the site. Arrange for all inspections by the local authorities. After completion of the work, furnish the Owner with a certificate of final inspection and approval from the Authority having jurisdiction.

1.06 SHOP DRAWINGS

- A. Submit shop drawings, manufacturers' data and certificates for equipment, materials and finish, and pertinent details for each system where specified. Five (5) copies shall be submitted to the Architect. Shop drawings will be returned "No Exceptions Taken", "Make Corrections Noted", "Revise and Resubmit", "Rejected", or "Submit as Specified", less two (2) copies. Work shall progress in accordance with "Reviewed" shop drawings (ONLY).
- B. Groups of similar shop drawings shall be submitted as individual bound documents with covers and indexes.
- C. Shop drawings must bear the Architect's review stamp. In the event that the Architect rejects shop drawings, the shop drawing must be revised and resubmitted for review.
- D. Review will be for type and quality. Quantities and the ability to perform the function intended shall be the responsibility of the Contractor.

1.07 SUBSTITUTIONS

- A. Any substitution of a product is subject to review by the Architect. Review of a substitute item is an indication only that the substitute item is compatible with the specified item as a claim of the manufacturer. Insure dimensional propriety, performance, and quality of the substitute item.
- B. Reference in the minimum standards to any product, material, fixture, form or type of construction, by proprietary name, manufacturer, make or catalog number, establishes a standard of quality or design and is not meant to limit competition. Use any equivalent substitute provided favorable written review by the Architect is first obtained.
- C. Substituted items and systems must meet or exceed the standard of quality and performance inherent in the specified item or system.

1.08 INCIDENTAL WORK IN OTHER DIVISIONS AND BY OTHER CONTRACTORS

- A. Excavation, trenching, backfill, transformer pad, cutting, patching and painting shall be as specified in the appropriate section of the specifications.

1.09 TEMPORARY POWER AND LIGHTING SYSTEM

- A. Temporary power for all trades will be provided under this section of the specification. The cost of the electrical power shall be as indicated in the General Conditions. Furnish at least a 200 amp single phase service, 120/240 volts with a 200 watt lamp holder for each room minimum. Furnish ground fault duplex outlets as required. Outlets shall be located so that 50' extension cords will reach any point in the building. Power to outlets shall be limited to 1/2 HP motors 120/240 volts. If additional power is required it shall be furnished by the trade requesting the service.

PART 2 EXECUTION

2.01 COORDINATION

- A. Coordinate work with the following to insure that the installation is in accordance with applicable requirements.
 - 1. CMP
 - 2. Portland Fire Department
 - 3. Verizon
 - 4. Owner selected monitoring company
 - 5. All trades and Architect/engineer.
 - 6. Owner
- B. Coordinate final locations of all electrical/telephone/data service drops with the Owner prior to installation.

2.02 RECORD DRAWINGS

- A. Submit a neatly marked up set of Electrical Drawings to the Architect for a record of final installation as actually installed. Include an accurate layout of all in-slab, under-slab and buried conduits. This copy will be returned to the Owner after records are made.

2.03 INSTRUCTIONS, OPERATION AND MAINTENANCE DATA

- A. At the completion of the work, furnish one (1) set of operating and maintenance instructions of equipment and systems. Submit name and address of nearest available source of repair service and replacement equipment and parts to the Owner. Explain and demonstrate the operation of each system to the Owner representative. The Fire Alarm System and the Security Alarm System manufacturers' field technician shall be present at this demonstration.

- B. Data shall include a complete set of shop drawings.

2.04 GUARANTEE - WARRANTY

- A. The work executed under this section shall be guaranteed to be free from defects of materials, and workmanship for a period of one (1) year from the date of the final certificate of acceptance. Guarantee shall further state that repair or replacement of any material and work which may become defective during the time of guarantee, together with other work damaged as a consequence of such defects shall be executed at no additional expense to the Owner.
- B. Materials furnished shall be new and the work executed shall be in accordance with applicable laws, regulations and codes.

2.05 TESTS

- A. After the interior wiring system installation is completed and at such time as the Owner may direct, conduct an operating test. The equipment shall be demonstrated to operate in accordance with the requirements of this specification. The tests shall be performed in the presence of the Owner or their authorized representative. Furnish instruments and personnel required for the tests.
- B. Upon completing the installation of the fire alarm system, conduct a complete test of the system in the presence of a representative of the fire alarm equipment manufacturer. During the course of the test, each manual station shall be activated, each smoke detector shall be smoke tested or an equivalent test performed, each rate-of-rise heat detector shall be activated by way of applying heat, each fixed temperature heat detector shall be activated by way of removing the fixed temperature heat fuse. The manufacturer shall supply a minimum of one year guarantee on fire alarm equipment.
- C. Each supervised circuit associated with the fire alarm system shall be opened at the most remote point in that circuit causing the trouble indication at the control panel to operate, thereby ascertaining that each circuit is supervised as required. At the completion of the test, submit a letter to the Owner, with a copy to the Engineer, stipulating that the fire alarm system was installed according to these specifications and complies with all applicable codes.
- D. The manufacturer shall furnish to the Owner, a one-year contract, effective from the date of acceptance, for maintenance and inspection services of the manufacturer's equipment with a minimum of two inspections during that

contract year. Written evidence of such inspections shall be left with the appropriate authorities.

- E. Coordinate and comply with local fire department requirements and requirements of the alarm monitoring service.

*** END OF SECTION ***

SECTION 16100
ELECTRICAL SYSTEMS AND EQUIPMENT

PART 1 GENERAL

- 1.01 DESCRIPTION: The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to install the electrical systems.
- A. Conductor material, installation and fittings shall meet NEC requirements. Conductors shall be listed for 600 volt AC unless otherwise noted.
 - D. The electric service shall emanate from a pad mount transformer furnished and installed by Central Maine Power.
- 1.02 GENERAL REQUIREMENTS: The provisions of Section 16000 "General Electrical" are made a part of this section.

PART 2 PRODUCTS

2.01 RACEWAYS AND FITTINGS

- A. Rigid steel conduit, electric metallic tubing, (elbows, couplings and fittings) shall be hot dipped galvanized steel and shall conform to the latest ASA Standards.
- B. Flexible metal conduit shall be galvanized steel (NEC-350). Liquid tight flexible conduit shall be UL listed (NEC-351).
- C. Fittings for rigid steel conduit shall be cast or malleable iron bodies, cadmium or zinc plated, with taper threads and tapped holes for screw attached cover plates for installation in moist or wet locations, and shall have gaskets of an approved material.
- D. Conduit boxes, outlet, switch, junction, pull boxes, extension rings, adapters, and cover plates shall be sherardized galvanized or cadmium plated. Boxes for concealed work shall be stamped steel with stamped steel accessories. Boxes for exposed work shall be cast or malleable iron. UL listed PVC boxes and fittings may be used for concealed construction where permitted by the NEC.

- E. Rigid non-metallic conduit shall comply with NEC-347 and shall be schedule 40 or Schedule 80 if required. Approved PVC solvent shall be used for welding PVC conduit and fittings. Furnish listed PVC expansion joints for PVC conduit runs per manufacturer's recommendations.

2.02 CONDUCTORS

- A. Panel feeders shall be aluminum. Type MC armored cable shall be used above ceilings and concealed in walls where permitted by the NEC. All branch circuits shall be copper.
- B. Grounding conductors shall be copper with green insulation.
- C. Copper conductors #2 and larger may be aluminum providing the following items are adhered to:
 - 1. The ampere capacity, voltage drop and conduit fill is in accordance with the NEC and equal to copper conductors specified herein.
 - 2. Prior to making any connection the aluminum wire is to be brushed and an oxide inhibitor applied.
 - 3. Lugs and connectors are to be rated cu/al compression type.
 - 4. Termination of aluminum conductors at heat producing equipment such as motors or heaters is not acceptable.

2.03 COLOR CODING OF CONDUCTORS

- A. The building power wiring shall be color coded for insulated 120/208 volt conductors where applicable. The neutral shall be white or gray. Use green for grounding conductors.

2.04 PANELBOARDS AND BOXES

- A. Contractor shall provide new main panel 120/208V, 3 phase sized by contractor. Contractor to provide Subpanels in tenant spaces (2) 225A 42 pole subpanel one on each floor at a minimum. Panels, cabinets, and boxes shall be code gauge steel. Boxes shall comply with NEC requirements. Concealed outlet boxes shall be of code gauge galvanized or sherardized metal not less than #14 gauge. Junction boxes shall be of code gauge steel or cast.
- B. Panelboards shall be furnished with active breakers, spare breakers and spaces as required. Panels shall have an equipment ground bus and when indicated shall also have an insulated and isolated ground bus for computer

circuits. Panels shall have main breaker or main lugs as required by the NEC.

1. Each subpanel shall have a hinged door with lock and typed directory.
 2. Terminal connectors shall be UL listed al/cu type.
 3. Flush and surface mounted panels shall have factory furnished trim. Panel boxes shall be galvanized steel, code gauge, primed and painted manufacturer's standard finish. Flush panels shall be furnished with 6-3/4" empty conduits stubbed up into hung ceiling space and capped for future use.
 4. Panel breakers shall be UL listed quick make, quick break, thermal magnetic type. Breakers shall have interrupting ratings capable of interrupting the available short circuit fault current. HVAC refrigeration loads require HACR rated breakers. Connect panel breakers to insure proper load balance between phases.
- C. Fused and unfused switches shall be General Duty or as required. Fuses shall be furnished for fused disconnect switches. Fuses shall be dual-element of required or specified voltage and current rating. Furnish Owner with one set of spare fuses for each type installed.

2.05 GROUNDING SYSTEMS

- A. Grounding conductors shall be copper and sized per N.E.C. Article 250 - Tables 250-66 and 250-122. Green grounding conductors shall be run in all raceways and cables shall include a green grounding conductor.
- B. Panelboards shall be furnished with equipment ground bus. Panelboards supplying computer receptacles shall also be furnished with insulated/isolated ground bus. Install an isolated grounding conductor back to main ground connection point.

2.06 ELECTRIC SERVICE

- A. Service shall be analyzed and redone or reworked as the design build team deems necessary, 120/208 volts, 3 phase, 4 wire, 60 Hz. Service size shall include a 25% future growth factor.
- B. Furnish and install the main service ground in compliance with Article 250 in the NEC.
- C. Individual feeders shall be installed from the main panel to the respective panels and/or equipment.

- D. Provide meter pedestal at pad mounted transformer (exterior rated) ct's in the pad.

2.07 LIGHTING FIXTURES

- A. Lighting fixtures in office area shall be lens troffers 2x4 three T8 lamps and electronic ballasts. 50 FC average. Coordinate locations with the Owner/Architect.
- B. Lighting in stairs, corridors, restrooms and storage areas shall be 30-40 footcandles and shall have wallswitch controls.

2.08 TELEPHONE/DATA SYSTEM

- A. Empty conduit system including entrance conduit.
- B. Empty J-box with 3/4" C to above ceiling at all locations. Provide two locations per office in administrative area. Provide four locations in the predication area with 3/4C all the way back to the IT room. Verify locations with Owner prior to rough-in.

2.09 FIRE ALARM SYSTEM

- A. Design/installation/testing of complete code compliant fire alarm system shall be the responsibility of the contractor.
- B. Provide a Knox Box if required by Portland Fire Dept.

2.10 WIRING DEVICES

- A. 20A, Commercial Grade, 120V. grounding type. Provide one on each wall of office spaces. One on every other column in the process /warehouse areas. Two on the mezzanine. One at each exterior door weatherproof, exterior rated. Provide (6) GFCI receptacles in Lab Room.

PART 3 EXECUTION

3.01 INSTALLATION OF PANELBOARDS

- A. Set panelboards and boxes plumb with the building lines. Mount panelboards so that the top of the panel is not higher than 6'-6" AFF.
- B. Panelboards shall have engraved plastic nameplates fastened with screws.

3.02 INSTALLATION OF GROUNDING SYSTEMS

- A. Grounding shall be in strict compliance with the National Electrical Code, Article 250.
- B. Metallic conduit shall be grounded in accordance with NEC requirements; and equipment grounding conductors shall also be furnished and installed in all branch circuit and feeder raceways. Cables shall include a separate, insulated grounding conductor.
- C. Equipment grounding conductors shall be insulated copper with green jacket as covered by the NEC.
- D. The green grounding screw on all wiring devices shall be used for grounding connections.

3.03 INSTALLATION OF ELECTRIC SERVICE

- A. Determine the maximum available short circuit fault current from CMP and furnish the main panel accordingly.
- B. Install empty primary conduits from pad mounted transformer to CMP transition pole. Provide pull wires in conduits. Include one spare primary conduit.

*** END OF SECTION ***