

SECTION 07 84 00

FIRESTOPPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems, products, materials and accessories.
- B. Through-penetration firestopping systems.
- C. Firestopping at intersections of fire-rated partitions and horizontal assemblies.

1.02 REFERENCES

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. ASTM E814 - Fire Tests of Through-Penetration Firestops.
- C. ASTM E119 - Fire Tests of Building Construction and Materials.
- D. ANSI/UL 2079-98 - Tests for Fire Resistance of Building Joint Systems.
- E. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
- F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier System Using Intermediate-Scale, Multi-story Test Apparatus.
- G. UL Fire Resistance Directory, Latest Edition.
- H. UL Fire Resistance Directory for Perimeter Fire Containment System per UL XHDG and UL XHGU.
- I. UL 1479 - Fire Tests of Through-Penetration Firestops.
- J. UL 2079 Tests for Fire Resistance of Building Joint Systems.
- K. Chapter 7, 2010 California Building Code.

1.03 SUBMITTALS

- A. Product Data: Provide data on product characteristics, performance and limitation criteria.

- B. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
 - 1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. UL approval numbers for firestopping materials, devices and systems.
- D. State approvals for firestopping materials and devices and systems.

1.04 QUALITY ASSURANCE

A. Qualifications

- 1. Manufacturer: Company specializing in manufacture of products specified in this Section, with minimum five years experience.
- 2. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."
 - a. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

B. Regulatory Requirements

- 1. Conform to Sections 712, 713, and 714 CBC for fire resistance standards and requirements for penetrations and joint systems in walls, partitions, floor-ceilings and roof-ceilings.
- 2. Firestop Systems installation shall meet requirements if ASTM 814, UL 1479, or UL 2079 tested assemblies that provide fire rating equal to that of construction being penetrated.
- 3. Maintain one copy of current UL Fire Resistance Directory Listings, on jobsite at all times.
- 4. Firestopping systems shall meet temperature limitations as described in ASTM E119 and hose stream exposure as described in ASTM E814.
- 5. Firestopping insulation, sealants, fill materials and devices shall have flame spread of 0, smoke density of 0, ASTM E84.
- 6. Electrical Boxes shall meet the requirements of UL 514.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when temperature of substrate material and ambient air is below manufacturer's minimum recommendations.
- B. Maintain ambient air temperature above this minimum temperature before, during and for 3 days after installation of materials.

- C. Provide ventilation in areas to receive solvent cured materials.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.07 SEQUENCING

- A. Sequence Work to permit firestopping materials to be installed during or after adjacent and surrounding Work is complete.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Manufacturers, products and systems as listed in UL Fire Resistance Directory, are approved for use under this Section:
 - 1. Through-Penetration Firestop Systems, (XHEZ) Field-Erected Type.
 - 2. Fill, Void or Cavity Materials (XHHW), Installed at Jobsite.
 - 3. Firestop Devices (XHJI), Factory Built Systems.
 - 4. Forming Materials (XHKU) Jobsite Applied.
 - 5. Through-Penetrating Products (XHLY) Cable, Conduit, Pipe and Tubing.
 - 6. Joint Systems (XHBN) showing Class II and Class III movement capabilities.
 - 7. Perimeter Fire Containment Systems per XHDG and XHGU.
- B. Manufacturers, products and systems as listed in the WHI Certification Listings, are approved for use under this Section:
 - 1. Through-Penetration Firestop Systems: Listed in "Firestop Systems" Section.
- C. Manufacturers of Systems or Devices not listed in the UL Directory Listings, but which can supply certification of approval since the 2005 or most recent publication date are similarly approved for use under this Section.
- D. Materials and devices utilized in the above referenced systems shall be used only in those systems in which they were tested. Substitutions are not permitted.

2.02 APPROVED FIRESTOPPING SYSTEMS

- A. Slotted Fire Track: CEMCO FAS Track ASTM A1003, Structural Grade 33, Type H, cut steel channel shaped, deep leg, 16 gauge (0.056") thick unless noted otherwise on drawings, 33 ksi steel unless noted otherwise on drawings, solid web, long leg at ceilings, profile to produce snug fit over adjacent components. Track is designed with intumescent fire proofing on both sides of the track. Intumescent material to lap over the top of the track by 0.25" on each side of the track and down each leg 1.18" to an external groove. Slotted fire track shall be listed by UL Fire Resistance Directory as a firestop for the application used.
- B. 3M Inc., St Paul, MN www.3m.com/firestop
1. Sealants, caulking, or spray materials used for openings between structurally separate sections of wall and floors, and top of wall conditions. Following products are acceptable:
 - a. 3M IC 15WB+ intumescent sealant.
 - b. 3M CP25WB+ intumescent sealant.
 - c. 3M FireDam 150+ acrylic latex sealant.
 - d. 3M Fire Barrier Mortar. Firestop Mortar.
 - e. 3M Fire Barrier 3000WT Water Tight Silicone Sealant
 - f. 3M FireDam Spray 200
 - g. Equivalent products listed in the U.L. Fire Resistance Directory – Volume 2
 2. Sealants, caulking or spray materials for use with fire-rated construction joints, edge of slab perimeter joints, and other gaps. Following products are acceptable:
 - a. 3M FireDam Spray 200
 - b. 3M FireDam 150+ acrylic latex sealant.
 - c. 3M Fire Barrier 1000 NS Silicone Sealant
 - d. 3M Fire Barrier 1003 SL Silicone Sealant
 - e. Equivalent products listed in the U.L. Fire Resistance Directory – Volume 2A, 2B.
 3. Cast-in place firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and cables bundles penetrating concrete floors, following products are acceptable:
 - a. 3M Fire Barrier Cast-in place MCID firestop device for use with Metallic penetrants
 - 1) Add Aerator adaptor when in used in conjunction with aerator (solvent) system.
 - b. 3M Tub Box Kit for use with tub installations.
 - c. 3M Fire Barrier Cast-in place PCID firestop device for use with noncombustible penetrants.
- C. Hilti Inc., Tulsa, OK.
1. Sealants, caulking, or spray materials used for openings between structurally separate sections of wall and floors, and top of wall conditions. Following products are acceptable:
 - a. Hilti CP 672 Firestop Spray
 - b. Hilti CP 601s Elastomeric Firestop Sealant

- c. Hilti CP 606 Flexible Firestop Sealant
 - d. Hilti CP 637 Firestop Mortar.
 - e. Equivalent products listed in the U.L. Fire Resistance Directory – Volume 2
2. Sealants, caulking or spray materials for use with fire-rated construction joints, edge of slab perimeter joints, and other gaps. Following products are acceptable:
 - a. Hilti CP 672 Firestop Spray
 - b. Hilti CP 601s Elastomeric Firestop Sealant
 - c. Hilti CP 606 Flexible Firestop Sealant
 - d. Equivalent products listed in the U.L. Fire Resistance Directory – Volume 2A, 2B.
 3. Cast-in place firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and cables bundles penetrating concrete floors, following products are acceptable:
 - a. Hilti CP 680 Cast-in place firestop device.
 - 1) Add Aerator adaptor when in used in conjunction with aerator (solvent) system.
 - b. Hilti CP 681 Tub Box Kit for use with tub installations.
 - c. Hilti CP 682 Cast-in place firestop device for use with noncombustible penetrants.
- D. Rectorseal Corp., Houston, TX.
1. Insulation Backer: Fiberglass.
 2. Sealant: METACAULK 1100, sprayed, 1/8 inch thick, from metal deck to gypsum board, both sides.
 3. Approval: WHI TRC/PV 60-04, T & F rating 60 minutes, WHI TRC/PV 120-14, T & F rating 120 minutes.
- E. ALBI Manufacturing Co., East Berlin, CN.
1. Insulation Backer: Mineral wool.
 2. Retaining Clips: 16 or 18 gauge, 3/4 flute depth, 1/2 flute width, both sides.
 3. Sealant: ALBI CLAD 161, caulked, 5/8 inch thick, around full perimeter of insulation, both sides.
 4. Install one or two 4 inch wide sections, 5/8 inch thick fire-rated gypsum board adjacent to top edge of gypsum board wall covering, both sides.
 5. Fill 1/2 inch deflection space with sealant, full depth, both sides.
- F. Specified Technologies, Inc., Somerville, NJ.
1. Latex Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:
 - a. SpecSeal Series SSS Intumescent Sealant
 - b. SpecSeal Series LCI Intumescent Sealant
 - c. SpecSeal Series LC Endothermic Sealant
 - d. SpecSeal Series AS Elastomeric Spray
 - e. SpecSeal Series ES Elastomeric Sealant
 2. Firestop Devices: Factory-assembled steel collars lined with intumescent material sized to fit specific outside diameter of penetrating item, the following products are acceptable:
 1. SpecSeal Series SSC Firestop Collars
 2. SpecSeal Series LCC Firestop Collars

3. Fire Rated Cable Pathways: STI EZ-PATH™ Brand device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable:
 1. EZ-PATH™ Fire Rated Pathway
4. Wall Opening Protective Materials: Intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24", the following products are acceptable:
 1. SpecSeal Series SSP Firestop Putty Pads
 2. SpecSeal Series EP PowerShield Insert Pads
5. Firestop Putty: Intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds, the following products are acceptable:
 1. SpecSeal Series SSP Firestop Putty
6. Wrap Strips: Single component intumescent elastomeric strips faced on both sides with a plastic film, the following products are acceptable:
 1. SpecSeal Series RED2 Wrap Strip
 2. SpecSeal Series BLU2 Wrap Strip
7. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating contained in a flame retardant poly bag, the following products are acceptable:
 1. SpecSeal Series SSB Firestop Pillows
8. Mortar: Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar, the following products are acceptable:
 1. SpecSeal Series SSM Firestop Mortar
9. Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag), the following products are acceptable:
 1. SpecSeal SIL300 Silicone Firestop Sealant
 2. SpecSeal SIL300 SL Self-Leveling Silicone Firestop Sealant
10. Silicone Foam: Multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam, the following products are acceptable:
 1. Pensil 200 Silicone Foam
11. Composite Sheet: Intumescent material sandwiched between a galvanized steel sheet and steel wire mesh protected with aluminum foil, the following products are acceptable:
 1. SpecSeal CS Composite Sheet
12. Cast-In-Place Firestop Device: Single component molded firestop device installed on forms prior to concrete placement with totally encapsulated, tamper-proof integral firestop system and smoke sealing gasket, the following products are acceptable:
 1. SpecSeal CD Cast-In Firestop Device
13. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts, the following products are acceptable:
 1. SpecSeal FyreFlange Firestop Angles

14. Firestop Plugs: Re-enterable, foam rubber plug impregnated with intumescent material for use in blank openings and cable sleeves, the following products are acceptable:
 1. SpecSeal Series FP Firestop Plug
15. Fire-Rated T Rating Collar Device: Louvered steel collar system with synthetic aluminized polymer coolant wrap installed on metallic pipes where T Ratings are required by applicable building code requirements, the following products are acceptable:
 1. SpecSeal T-Collar Device
16. Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing individual cable penetrations up to 0.27 in. (7 mm) diameter, the following products are acceptable:
 1. Ready Firestop Grommet

G. Or equal in accordance with Division 01, General Requirements.

2.03 FIRESTOPPING AT ELECTRICAL BOXES AND UTILITY OUTLETS

- A. Steel electrical outlet boxes on opposite sides of walls requiring protected openings shall be separated by horizontal distance of 24 inches.
- B. Steel electrical outlet boxes that occur in combination with outlet boxes of size such that aggregate area of unprotected outlet boxes exceeds 100 square inches in any 100 square feet of wall area shall be protected by approved material or detail to decrease aggregate area of unprotected utility boxes to less than 100 square inches in any 100 square feet of wall.
- C. Steel electrical outlet boxes that do not exceed 16 square inches in area shall be protected by an approved firestop material: at each side of wall:
 1. CP 617 and CP 617L MOLDABLE FIRESTOP PUTTY PADS, by Hilti Inc. Tulsa, OK
 2. MPP-4S MOLDABLE PUTTY PADS, by 3M Contractor Products, Minneapolis, MN.
 3. FSP FIRESTOP PUTTY PADS, by Hevi-Duty Nelson Products, Tulsa, OK.
 4. SPECSEAL PUTTY PADS, By Specified Technologies, Inc., Somerville NJ.
 5. Johns Manville, Denver CO. Firetemp Puddy Pad.
 6. Or equal as approved in accordance with Division 01, General Requirements for Substitutions.
- D. Utility and electrical outlets or boxes shall be securely fastened to the stud or framing of the wall, or ceiling assembly. The opening in the gypsum board facing shall be cut so that the clearance between the box and the gypsum board does not exceed 1/8 inch.
 1. In smoke walls the 1/8 inch clearance shall be filled with an approved fire-rated sealant.

2.04 SAFING INSULATION - GENERAL

- A. Safing: Mineral wool, Thermafiber Safing Insulation by Thermafiber LLC, 4 inches thick minimum, UL Listed, R4643.
- B. Fill, Void or Cavity Material: Dynamic; Specified Technologies Inc., SpecSeal AS200, UL Listed, R4643.
- C. Locations: as indicated in drawings, and at all gaps, crevices and openings between multistory floors and walls requiring Fire Rated protection.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions.
- B. Verify that openings are ready to receive Work of this Section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material or other matter that may affect bond of firestopping material.
- B. Remove incompatible materials that affect bond.
- C. Install backing materials to arrest liquid material leakage.

3.03 APPLICATION

- A. Install fluted through penetration firestopping system per Section 09 22 16 [05 40 00].
- B. Apply primer, firestop sealant or other firestop materials in accordance with manufacturer's recommendations and as approved by regulatory agencies. Apply at voids between fire-rated assemblies and adjoining fire-rated materials or assemblies.
- C. Apply firestopping materials with sufficient thickness or configuration to achieve designated fire rating.
- D. Install firestopping material in locations where designated fire rating must be maintained, including, but not limited to following:
 - 1. Voids or annular openings around sleeves, piping, ductwork or electrical/communications conduits that penetrate fire rated walls, partitions, floors, ceilings or assemblies.
 - 2. Intersections of fire-rated vertical and horizontal assemblies, including but not limited to door and window frames.
- E. Remove dam material after firestopping material has cured.

- F. Safing Insulation: Install compression fit and with support accessories specified where required.

3.04 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION OF FINISHED WORK

- A. Protect finished Work.
- B. Protect adjacent surfaces from damage by material installation.

3.06 INSPECTION

- A. Notify Inspector before Work is covered. Approval of Inspector shall be received before any Work is concealed in manner that will make inspection difficult. Work that has been covered prior to inspection and approval shall be uncovered, inspected and recovered.

END OF SECTION

SECTION 07 84 13

FIRESTOPPING WIRING DEVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Fire rated wiring devices for cables through fire-rated walls.
- B. Fire rated wiring devices and associated hardware as indicated on Contract Drawings.
- C. Related Section 07 84 00 Firestopping.

1.02 REFERENCES

- A. ASTM E 814 - Fire Tests of Through-Penetration Firestops.
- B. ANSI/UL 1479 - Fire Tests of Through-Penetration Firestops.
- C. UL Fire Resistance Directory, Latest Edition.
- D. Chapter 7, 2010 California Building Code.

1.03 SUBMITTALS

- A. Product Data: Provide data on product characteristics, performance and limitation criteria.
- B. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- C. UL approval numbers for firestopping wiring devices and systems.

1.04 QUALITY ASSURANCE

- A. Qualifications
 - 1. Manufacturer: Company specializing in manufacture of products specified in this Section, with minimum five years experience.
 - 2. Applicator: Company specializing in performing Work of this Section, with minimum three years experience who specializes in installation of firestop products. Personnel shall be certified, licensed, or otherwise qualified by firestopping manufacturer as having been provided necessary training to select and install products according to manufacturer's requirements.
- B. Fire rated wiring devices shall bear the UL Classification marking.
- C. Device shall be tested in accordance with ANSI/UL1479 (ASTM E 814).

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

1.06 SEQUENCING

- A. Sequence Work to permit firestopping materials to be installed during or after adjacent and surrounding Work is complete.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Specified Technologies Inc., Somerville, NJ; Product: EZ Path Fire Rated Pathway (UL # XHJI.14579)
- B. Or manufacturers, products and systems as listed in UL Fire Resistance Directory, are approved for use under this Section:
 - 1. Firestop Devices (XHJI), Factory Built Systems.
 - 2. Through-Penetration Firestop Systems, (XHEZ) Field-Erected Type.
- C. Materials and devices utilized in the above referenced systems shall be used only in those systems in which they were tested. Substitutions are not permitted.

2.02 FIRE RATED WIRING DEVICES

- A. Cables passing through fire-rated floors or walls shall pass through fire-rated wiring devices that contain an intumescent insert material that adjusts automatically to cable additions or subtractions.
- B. The device shall have an F Rating equal to the rating of the barrier in which the device is installed.
- C. Wiring devices shall be capable of allowing a 0 to 100-percent visual fill of cables.

- D. Wire devices shall be of a sufficient size to accommodate the quantity and size of electrical wires and data cables required.
- E. Wire devices to be provided with steel wall plates allowing for single or multiple devices to be ganged together.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions.
- B. Verify that openings are ready to receive Work of this Section.

3.02 INSTALLATION

- A. Wiring devices shall be installed in locations where indicated on Drawings, arranged singly or in gangs at the height specified.
- B. Install the devices in strict accordance with the approved shop drawings and the equipment manufacturer's recommendations.
- C. Apply the factory supplied gasketing material prior to the installation of the wall plates.
- D. Secure wall plates to devices per the equipment manufacturer's recommendations.

3.03 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.04 PROTECTION OF FINISHED WORK

- A. Protect finished Work.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 08 12 13

HOLLOW METAL FRAMES – WELDED

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Non-rated Welded steel frames for doors.

1.02 REFERENCES

A. SDI - Steel Door Institute.

1. SDI 100 - Recommended Specifications for Standard Steel Doors and Frames, Latest Edition.
2. SDI 111 - Recommended Standard Details Steel Doors and Frames.
3. SDI 117 - Manufacturing Tolerances Standard Steel Doors and Frames.
4. SDI 118 - Basic Fire Door Requirements.

B. ANSI – American National Standards Institute

1. ANSI A224.1 - Standard Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
2. ANSI A250.4 and A450.5 - Test Procedure / Acceptance Criteria for Physical Conformance.
3. ANSI A250.6- Hardware on Steel Doors (Reinforcement Applications).
4. ANSI A250.8/SDI-100 - Recommended Specifications for Standard Steel Doors and Frames, Latest Edition.
5. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Steel Surfaces for Steel Doors and Frames.
6. ANSI A250.11/SDI-105 - Recommended Erection Instructions for Steel Frames.

C. ASTM - American Society for Testing and Materials

1. ASTM A653/A653M- Sheet Steel, Zinc-Coated (Galvanized) or Zinc - Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A924/A924M – General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
3. ASTM A1008/A1008M - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
4. ASTM D6386 – Preparation of Hot-Dipped Galvanized Coated Iron and Steel and Hardware Surfaces for Painting.

D. CBC - 2010 California Building Code.

E. CRSC - California Referenced Standards Code (CCR Title 24, Part 12)

1. CRSC-7A.2 - Standard 12-7A-2, Exterior Windows
2. CRSC-7A.4 - Standard 12-7A-4 Fire Resistive Standards, Fire Door Assemble Tests
3. CRSC-10.2 - Standard 12-10-2 Single Point Latching or Locking Devices
4. CRSC-10.3 - Standard 12-10-3 Emergency Exit and Panic Hardware

- F. NFPA – National Fire Protection Association
 - 1. NFPA 80 - Fire Doors and Windows
- G. UL – Underwriters Laboratories, Inc.
 - 1. UL-10B – Fire Test of Door Assemblies
 - 2. UL 10C – Positive Pressure Fire Tests of Door Assemblies
- H. Standard 12-7-4 Fire Resistive Standards, Fire Door Test Assembly Tests - California Referenced Standards Code, CCR Title 24, Part 12

1.03 SUBMITTALS

- A. Shop drawings indicating frame configuration, anchor types and spacing, location of cutouts for hardware, reinforcement and finish.
- B. Product data.
- C. Manufacturer's installation instructions.
- D. Job Closeout: provide one complete manufacturer's catalog to Owner's lock shop or Authorized Representative.

1.04 QUALITY ASSURANCE

- A. Manufacture frames to conform to SDI standards except where exceeded by this Specification.
- B. Comply with ANSI/SDI A250.4 Level A, one million cycle swing test performance for 3070 door frames.
- C. Manufacturer: Company specializing in manufacturing products specified in this Section having minimum five (5) years experience.
- D. Installer: Firm with minimum five (5) years experience in installation of metal doors and frames.

1.05 DELIVERY, STORAGE AND PROTECTION

- A. Deliver and protect frames with manufacturer's shipping safeguards.
- B. Attach spreader bars on welded frames to preclude warping or bending during delivery and storage.
- C. Storage: Store in dry secure location. Place units on minimum 4 inch high wood blocking. Avoid non-vented plastic or canvas shelters. Provide 1/4 inch wide spaces between stacked units.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products of following manufacturers form basis for design and quality intended.
 - 1. Manufacturers belonging to Steel Door Institute, Cleveland, OH.
- B. Or equal in accordance with Division 1, General Requirements for Substitutions.

2.02 WELDED FRAMES

- A. Type: Standard frames with integral stop and flat trim, double rabbet, profiles as indicated on Drawings, cold rolled steel, Commercial Steel, ASTM A1008/A1008M, galvanized steel ASTM A653 and ASTM A924 for exterior applications. Minimum: 16 gauge.
 - 1. Drywall: Provide backbend returns.
 - 2. Plaster: Keyed-in-frame backbends.
- B. Anchors: Provide two anchors at head for openings up to 48 inches, three if wider, maximum 30 inches on centers. Provide three at jamb for doors up to 84 inches in height, additional anchors at maximum 30 inches on centers for higher doors.
 - 1. Provide appropriate type of anchors consistent with type of wall construction for each installation and in conformance with SDI 111 and ANSI 250.11.
 - 2. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c.
 - 3. Masonry Type: 16 gauge T-shaped anchors to suit frame size, not less than 16 gauge thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; minimum 3 per jamb.
- C. Floor Attachment: Provide adjustable base anchor with extension for expansion anchor attachment to concrete floor. Extension factory welded. Minimum thickness: 14 gauge.
 - 1. Wedge Type: KWIK Bolt TZ, 3/8 to 3/4 inch diameter, ICC ESR-1917, by Hilti Inc., Tulsa, OK. Refer to Section 01 40 00.
 - 2. Monolithic Concrete Slabs: Clip-type anchors, with holes to receive fasteners.
- D. Hardware Attachment: Mortise, reinforce, drill and tap at factory to receive specified hardware. Install minimum 10 gauge reinforcing welded to frame for surface mounted hardware, except install 7 gauge reinforcing for hinges. Tap to templates.
 - 1. Install reinforcing for closers, both sides of frames, on all frames, single and pairs, labeled and non-labeled.
 - 2. Use 10 Gauge reinforcing for locks, panics, closers, and hold-open arms.
- E. Silencers: Make provision for minimum three rubber silencers at strike jamb of all doors except fire-rated doors, and one at head of each leaf of double doors, except fire-rated doors.

2.03 PROTECTIVE COATINGS

- A. Interior Frames:
 - 1. Metallic coating protection not required.
 - 2. Pretreat and shop prime, air-dried, conforming to ANSI A250.10. Approved Primer: Series 18 Enviro Prime @ 2-4 mils DFT Gray, by Tnemec or equal.
 - 3. Finish paint frames under Section 09 90 00 Painting.
- B. Exterior Frames:
 - 1. Metallic coating protection required: ASTM A653/A653M, zinc type G60 Grade designation.
 - 2. Pretreat and shop prime, air-dried, conforming to ANSI A250.10, approved primer Series L69 Hi Build Epoxoline II @ 3-4 mils DFT Gray, by Tnemec or equal.
 - 3. Finish paint frames under Section 09 90 00.
 - 4. Wipe coat galvanized steel is not permitted.
- C. On surfaces where metallic coating has been damaged or removed during fabrication, frames shall be touched-up with factory-applied primer.

2.04 FABRICATION

- A. Fabricate exterior welded steel door frames machine-mitered and full welded (continuously) unit type. Weld and grind smooth. No intermittent welds or plate splices permitted at intersections.
- B. Fabricate interior welded steel door frames as machine-mitered face-welded unit type. Weld and grind smooth.
- C. Where cross mullions or T intersections occur, frames shall be fabricated as butted and face-welded assembly joints. At mullion-to-base intersections extend mullion to floor and face weld. Where butted joints are exposed to weather, seal intersection as specified in Section 07 92 00.
- D. Machine mitered faces and butt-joined integral stops permitted with continuous welds.
- E. Fabricate frames with hardware reinforcement plates welded in place.
- F. Fabricate frames to accept anchors as described in SDI-111 for type of wall construction.
- G. Reinforce frames for door closers on both sides of frames.
- H. Apply primer to all surfaces of frames, in accordance with requirements of ANSI A250.10. Metallic-coated protected surfaces shall be pretreated prior to application of primer.

- I. Grout solid all frames in or abutting masonry or concrete walls. Provide steel plaster guards or mortar boxes, welded to frame, at back of hardware cutouts where installed in concrete, masonry or plaster openings. Protect inside throat of frame in grout-filled conditions with waterproof under coating material 1/8 inch thick minimum, field-applied by installer.
 1. Non-Shrink Grout: ASTM C1107, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; of damp-pack to plastic consistency.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install frames in accordance with ANSI A250.11/SDI-105.
 1. Installation of jamb anchors to steel framing: weld to studs.
 2. Install Floor anchors, 1 clip angle per jamb with expansion wedge type anchor.
 3. Install T-shaped anchors. Grout frame in the area of the anchors as block courses are laid up.
 4. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
- B. Install insulation behind frames.
- C. Coordinate anchor placement with type of wall construction.
- D. Paint frames under Section 09 90 00, Painting.

3.02 TOLERANCES

- A. Conform to standard of tolerances as required in SDI-117.

END OF SECTION

SECTION 08 13 13

HOLLOW METAL DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Non-rated rolled-steel doors.
- B. Louvers

1.02 REFERENCES

- A. SDI - Steel Door Institute.
 - 1. SDI 100 - Recommended Specifications for Standard Steel Doors and Frames, Latest Edition.
 - 2. SDI 118 - Basic Fire Door Requirements.
 - 3. SDI 111 - Standard Details Steel Doors and Frames.
 - 4. SDI 117 - Manufacturing Tolerances Standard Steel Doors and Frames.
- B. ANSI - American National Standards Institute
 - 1. ANSI A250.4 - Test Procedures and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
 - 2. ANSI A250.5 - Accelerated Physical Endurance Test Procedure for Steel Doors, Frames, and Frame Anchors.
 - 3. ANSI A250.8/SDI 100 - Recommended Specifications for Standard Steel Doors and Frames.
 - 4. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 - 5. ANSI A250.11/105 - Recommended Erection Instructions for Steel Frames.
- C. ASTM - American Society for Testing and Materials
 - 1. ASTM A653/A653M-98 - Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM A924/A 924M - General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - 3. ASTM A1008/A1008M - Standard Specifications for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - 4. ASTM A568/A568M - General Requirements for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.
- D. CBC - 2010 California Building Code
 - 1. CBC-10 - CBC Chapter 10, Means of Egress
 - 2. CBC-11 - CBC Chapter 11B, Accessibility to Public Buildings, Public Accommodations, Commercial Facilities and Publicly Funded Housing

1.03 SUBMITTALS

- A. Shop drawings indicating core material, location of cutouts for hardware, reinforcement and finish.
- B. Product data.
- C. Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

- A. Manufacture doors to conform to SDI standards except where exceeded by this Specification.
- B. Comply with ANSI/SDI A250.4 Test Procedure and Acceptance Criteria for –Physical Endurance for Steel Doors and Hardware Reinforcings. Level A, one million cycle swing test performance.

1.05 DELIVERY, STORAGE AND PROTECTION

- A. Deliver and protect doors with manufacturer's shipping safeguards.
- B. Storage: Store in dry secure location. Place units on minimum 4 inch high wood blocking. Avoid non-vented plastic or canvas shelters. Provide 1/4 inch wide spaces between stacked doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products of following manufacturers form the basis for design and quality intended.
 - 1. Any manufacturer belonging to the Steel Door Institute.
- B. Or equal in accordance with Division 01, General Requirements for Substitutions.

2.02 DOORS

- A. Exterior Doors: ANSI A250.8/SDI-100, Level 3, extra heavy-duty, 1-3/4 inches thick, Model 2 Seamless, 16 gauge cold-rolled face sheets, ASTM A653/A-653M, Seamless, continuously welded seam dressed smooth, hollow-steel construction, sizes as scheduled on drawings. Close top and bottom with flush end closure, beveled edge profile.
- B. Interior Doors: ANSI A250.8/SDI-100, Level 2, heavy-duty, 1-3/4 inches thick, Model 2, 18 gauge cold-rolled face sheets, ASTM A1008, seamless continuously welded seam dressed smooth, hollow-steel construction, Close top and bottom with flush end closure, beveled edge profile, sizes as scheduled on drawings, prime coated only.
- C. End Closures: Minimum 18 gauge. 14 gauge for temperature-rise doors.

2.03 DOOR CORE

- A. Performance Test Procedures Requirements: Conform to ANSI A250.4
- B. Core for non-fire-rated doors:
 - 1. Core for exterior doors and Thermal-Rated (Insulated) Doors: vertical stiffeners 6 inches o.c., 20 gauge steel, spot welded to face sheets 6 inches o.c. with minimum 1.5 lb/cu.ft. density insulation U-factor 0.29 minimum and R-factor of 3 min. or with min. polystyrene 1 lb/cu ft. density of U-factor 0.21 min. and R-factor of 5 min., full thickness of cavities.
 - 2. Core for interior doors: rigid polystyrene foam board 1 lb/cu.ft. minimum density. Compressive strength 1750 psf and shear strength minimum 18 psi. U-factor of 0.21 min. and R-factor 5 min.
 - 3. Core construction shall conform to requirements of the grade of door specified in accordance with ANSI A250.8/SDI-100, Sections 2.3.2 and 1.4.

2.04 ACCESSORIES

- A. Louvers
 - 1. Inverted split Y type, non-vision, Model FDLS manufactured by Anemostat Products Division, Carson, CA, or an approved equal.
 - a. Frame: 18 gauge.
 - b. Louver Blades: 18 gauge.
 - c. Finish: Factory primed. Paint under Section 09 90 00.
 - d. Exterior Doors: Provide one-way vandal-proof through-bolts and 18-14 mesh insect screen. Unit shall be hot-dip galvanized after fabrication.
 - e. Sizes: refer to drawings for types.

2.05 PROTECTIVE COATINGS

- A. Interior Doors:
 - 1. Metallic-coating protection not required.
 - 2. Pre-treat and shop prime with modified alkyd, air-dried, conforming to ANSI A250.10. Approved Primer: Series 18 Enviro Prime @ 2-4 mils DFT gray, by Tnemec or equal.
- B. Exterior Doors:
 - 1. Metallic coating protection required, types permitted: ASTM A653/A-653M, hot-dip galvanized, zinc-coated Commercial Steel, G60 Grade coating designation.
 - 2. Pre-treat and shop prime with modified alkyd, air-dried, conforming to ANSI A250.10. Approved primer: Series L69 Hi Build Epoxoline II at 3- to 4-mils DFT gray by Tnemec or equal.
- C. On surfaces where zinc has been damaged or removed during fabrication, doors shall be touched-up with factory-applied primer.

2.06 FABRICATION

- A. Fabricate doors from cold-rolled steel conforming to ASTM A1008/A1008M or ASTM A924. Stretcher-leveled standard of flatness for face sheets.
- B. Manufacturing tolerances per SDI 117 - Manufacturing Tolerances Standard Steel Doors and Frames.
- C. Fabricate doors with cutouts sized for hardware and openings as indicated. Non-handed doors using hinge fillers are not permitted.
- D. Reinforce, drill and tap doors to receive mortise hinges, locks, latches, flush bolts and closer. Use reinforcing gauges as listed in Table 4 of ANSI A250.8/SDI-100. Channel or plate reinforcing only.
- E. Locate hardware according to Table 5, ANSI A250.8/SDI-100, CBC 1133B.2.5.2.
- F. Apply primer to all surfaces of doors in accordance with requirements of ANSI A250.10. Metallic-coated surfaces shall be pre-treated prior to application of primer.
- G. Attach fire-rated label to hinge-stile of each fire-rated door unit and frames.
- H. Hardware Enclosures: Provide enclosures and junction boxes within doors for electrically operated door hardware, interconnected with UL-approved, 1/2-inch- (12.7-mm-) diameter conduit and connectors.
 - 1. Where indicated for installation of wiring, provide access plates to junction boxes, fabricated from same material and thickness as face sheet and fastened with at least 4 security fasteners spaced not more than 6 inches (152 mm) on centers.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that openings are ready to receive Work and field measurements are as indicated on shop drawings.
- B. Verify mechanical, electrical and building items affecting Work of this Section are placed and ready to receive this Work.
- C. Beginning of installation means acceptance of existing conditions.

END OF SECTION

SECTION 08 14 23

PLASTIC FACED WOOD DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Plastic faced wood doors, non-rated.
- B. Installation of doors.

1.02 REFERENCES

- A. ANSI A208.1 - Mat Formed Wood Particle Board.
- B. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.
- C. WDMA/NWWDA I.S.1-A-97 - Architectural Wood Flush Doors.
- D. NEMA LD-3 - High Pressure Decorative Laminates.
- E. Chapter 10 California Building Code.
- F. WI - Manual of Millwork, Woodwork Institute, Latest Edition.
- G. NFPA 80 - Fire Doors and Windows.
- H. UL - Underwriters Laboratories.
- I. WH - Warnock Hersey.
- J. ADA – Americans with Disabilities Act of 1990, as amended.
 - 1. ADA Standards – ADA Title II Regulations and the 2010 ADA Standards for Accessible Design.
- K. CACRM - California Access Compliance Reference Manual, latest updates and based on the 2010 California Building Code.

1.03 SUBMITTALS

- A. Shop drawings indicating door elevations, types, hand, thickness, stile and rail reinforcement, internal blocking for hardware attachment and cutouts.
- B. Product data.
- C. Tree samples of each door type specified, illustrating color of laminate and texture. Samples shall illustrate core material.

- D. Manufacturer's installation instructions.
- E. Certificate of compliance for fire-rated doors.

1.04 QUALITY ASSURANCE

- A. WDMA I.S. 1A-(Latest Edition) – Window and Door Manufacturers Association.
- B. Conform to NFPA 80 for fire rated class indicated.
- C. Provide doors from one manufacturer only.
- D. Doors shall be manufactured in accordance with Section 12 of latest edition of the manual of the Woodwork Institute for **Premium [Architectural]** Grade or to higher standards as specified herein. Hot pressed 5-Ply construction only, bonded construction.
- E. Before delivery to jobsite, door supplier shall submit WI Certified Compliance Certificate, countersigned by manufacturer, indicating products he will furnish for this job, and certifying that they will fully meet requirements of grade or grades specified.
- F. First page of shop drawings shall bear WI Certified Compliance Label. Shop drawings not conforming to this requirement will be rejected.
- G. One (1) copy of the latest issue of the WI Manual of Millwork shall be made available for reference at the jobsite throughout the installation period.
- H. Upon completion, WI Certified Compliance Certificate, countersigned by manufacture, shall be submitted.
- I. Regulatory Requirements
 - 1. Conform to Section 1008, and Section 715, California Building Code.

1.05 DELIVERY, STORAGE AND PROTECTION

- A. Protect doors with resilient packaging sealed with heat shrunk plastic or other manufacturer's shipping safeguards.
- B. Package, deliver and store doors in accordance with WI requirements.
 - 1. Store in dry, broom-clean area.
 - 2. Protect materials from damage.
 - 3. Replace units damaged, warped or otherwise not usable.
- C. Exposed Wood at Tops, Bottoms and Cutouts for Hardware and Accessories: Seal prior to shipment.

1.06 WARRANTY

- A. Provide under Provisions of Division 01, General Requirements.

- B. Provide life of original installation warranty for interior doors.
 - 1. Warranty shall state that doors will not warp, twist, bend, shrink, delaminate, buckle or disengage, or the joints open for the warranty period. Any door of 25 square feet or larger may have a warp or twist of not more than 1/4 inch in eight feet. Any door that develops defects within scope of warranty shall be replaced with new door without expense to Owner.
 - 2. During first year of warranty, replacement doors shall be delivered to Contractor for installation.
 - 3. During succeeding years of warranty, replacement doors shall be delivered to building in which defective door is located. Bill of lading shall indicate name of building and room or location where door is to be replaced.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products of the following manufacturers form the basis for design and quality intended.
 - 1. Marshfield Door Systems Inc., Marshfield, WI.
 - 2. Eggers Industries, Two Rivers, WI.
 - 3. Algoma Architectural Doors, Algoma, WI.
 - 4. Oshkosh Architectural Door Co., Oshkosh, WI
 - 5. AMPCO, Opa Locka, Florida.
- B. Or equal as approved in accordance with Division 01 General Requirements for substitutions.

2.02 DOOR TYPES

- A. Laminate Particle Board Core: Marshfield Door Systems DPC-1, (Non-Fire Rated), or equal.
 - 1. Thickness: 1-3/4 inch.
 - 2. Face: Plastic Laminate, 0.05 inch thick minimum.
 - 3. Crossband: Hardwood Veneer, 1/16 inch thick.
 - 4. Side Edges: Two ply, 1-3/8 inch laminated outer strip, species at mill option. Bonded construction.
 - 5. Top and Bottom Edges: 1-1/8 inch hardwood or softwood mill option.
 - 6. Face Assembly Adhesive: Type II, water-resistant.
 - 7. Core Assembly Adhesive: Type II, water-resistant.
 - 8. Core: Particleboard, 28 lb minimum density, ANSI A208.1 [minimum 25 percent post-consumer recycled content, no added urea-formaldehyde]
 - 9. Moisture Stripping: Sealed edges.
 - 10. Blocking for Hardware: Flame resistant, 6 inch top edge for closers, 5.5 inches for bottom hardware or automatic closers where applicable, 5 x 18 inch lock blocks, 5.5 inch cross blocking for panic hardware, 5 x 12 inch for floor closers or pivot hinges where applicable.

2.03 PLASTIC LAMINATE MANUFACTURERS

- A. Products of the following manufacturers form the basis for design and quality intended.
 - 1. Formica Corporation, Cincinnati, OH.
 - 2. Ralph Wilson Plastics Co., Temple, TX.
 - 3. Nevamar Corporation, Odenton, MD.
 - 4. Pionite Decorative Laminates, Maumee, OH.
 - 5. Laminart, Elk Grove Village, IL.
- B. Or equal as approved in accordance with Division 01, General Requirements for substitutions.

2.04 PLASTIC LAMINATE

- A. Material: NEMA LD3, decorative high pressure laminate, general purpose type, 0.050 inch thick.
- B. Colors and textures: Refer to Section 09 06 00 Schedules for Finishes.

2.05 FABRICATION

- A. Fabricate non-rated doors in accordance with WI Premium **[Architectural]** Standards.
- B. Fabricate fire rated doors in accordance with WI Premium **[Architectural]** Standards and to NFPA, UL or WH requirements. Attach permanent metal fire rating label to door edge, either on hinge stile or top edge.
- C. Intumescent Seals: Fabricate fire-rated doors with concealed intumescent seals in accordance with UL 10C. Furnish flush with door edge type intumescent seals, exposed at top rail and veneer-covered at stiles. Surface-applied adhesive seals, kerfed-applied or mechanically fastened seals not permitted.
- D. Premachine doors at factory for finish hardware. Cutouts for hardware in wood doors having a fire rating of 20 minutes or more shall be accomplished at the factory before labels are affixed. Preparation shall be performed in accordance with manufacturer's inspection service procedure and under label service.
- E. Five-ply construction for plastic laminate face doors only.
- F. Prefit doors at factory.
- G. Apply plastic laminate to door faces and vertical edges in accordance with WI Premium Grade.

PART 3 - EXECUTION

3.01 INSTALLATION OF DOORS

- A. Door shall have a clearance of 1/8 inch at the sides and top and shall have bottom clearance of 1/4 inch over thresholds and 1/2 inch at other locations unless otherwise indicated. The lock edge or both edges of door shall be beveled at the rate of 1/8 inch in 2 inches. Cuts made on the job shall be sealed immediately after cutting, using a clear varnish or sealer.
- B. Machine cut relief for hinges.
- C. Pilot drill screw and bolt holes.
- D. Prepare doors to receive finish hardware in accordance with applicable BHMA Standards requirements. Seal tops, bottoms and cutouts for hardware and accessories per Section 09 90 00.
- E. Conform to applicable BHMA requirements for fit tolerances.

3.02 INSTALLATION OF HARDWARE

- A. Install hardware in accordance with manufacturer's instructions.
- B. Use the templates and fasteners provided by hardware item manufacturer.
- C. Mounting heights for hardware:
 - 1. Locksets: 40-5/16 inches from floor to centerline of lever handle, hand operated opener or exit hardware, unless noted otherwise.
 - 2. Butts: 5 inches from head of opening to top of top butt; 10 inches from finish floor to bottom of bottom butt; intermediate butt spaced equidistant between top and bottom butts.
- D. Conform to CACRM for positioning requirements for accessibility.
- E. After fitting hardware to doors which are scheduled for field painting and sealing of cutouts, remove all finish hardware, carefully replace in properly marked boxes, and place in storage until painting and finishing is completed. After painting and finishing is completed, permanently install finish hardware.
- F. Secure finish hardware with suitable fasteners of the same material and finish as the item being attached. Refer to Section 08 71 00.
- G. Provide expansion anchors for attaching hardware items to concrete or masonry.
- H. Mount exit devices and closers with closed head sex bolts.

- I. Cutouts for hardware in wood doors having a fire rating of 45 minutes or more shall be accomplished at the factory before labels are affixed. As an alternative, said fire rated doors may be machined at the jobsite by a Warnock-Hersey authorized representative, when authorized in writing by the Architect and when such doors are affixed with an identification sticker at the factory stating the door is eligible to receive the designated fire rating.

3.03 INSTALLATION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge corner to corner, or as required to meet door warranty.
- B. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 31 13

ACCESS DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Non-rated access doors and frames in ceilings.
- B. Related Sections
 - 1. Section 09 90 00, Painting: Field paint finish.
 - 2. Division 23 – Mechanical: Locations and requirements for access doors.
 - 3. Division 26 – Electrical: Locations and requirements for access doors.

1.02 REFERENCES

- A. UL - Underwriter's Laboratories.
- B. WH - Warnock Hersey.
- C. NAAMM – National Association of Architectural Metal Manufacturers

1.03 SUBMITTALS

- A. Shop Drawings: Indicate exact positions of all access units.
- B. Product data including sizes, types, finishes, scheduled locations and details of adjoining Work.
- C. Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

- A. Manufacture fire-rated access doors and frames to conform to UL or WH requirements.
- B. Provide labels indicating rating.

1.05 COORDINATION

- A. Coordinate Work and locations with mechanical and electrical work requiring access units.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Products of following manufacturers form basis for design and quality intended.
 - 1. Milcor Incorporated; Holland, OH.
 - 2. The Bilco Company, New Haven, CT.

3. Karp Associates, Inc.; Maspeth, NY.
4. JL Industries Incorporated; Bloomington, MN.
5. Larsen's Manufacturing Company; Minneapolis, MN.
6. Nystrom Building Products; Minneapolis, MN.
7. Williams Brothers Corporation of America; Reno, NV.

- B. Or equal as approved in accordance with Division 01, General Requirements for Substitutions.

2.02 FABRICATION

- A. Fabricate components so as to be straight, square, flat and in same plane where required. Slightly round exposed edges and provide access without burrs, snags and sharp edges. Size: Minimum of 24 inches by 30 inches, unless otherwise shown or noted on mechanical or electrical Drawings or specified herein.
- B. Weld continuous, fill and grind joints smooth to assure flush and square unit.
- C. Hardware: 175 degree steel hinges with removable pin.
- D. Number of locks and non-continuous hinges shall be as required to maintain alignment of panel with frame.
- E. Provide anchors or make provisions in frame for anchoring to adjacent construction. Provide size, number and location of anchors as required to secure access door in opening.

2.03 ACCESS DOORS, FLUSH PANEL

- A. In Gypsum Board framed ceilings: Milcor Model DW prime painted with concealed hinges.
- B. Door Panel: Form of 14 gauge thick steel sheet. Reinforce as required to maintain flat surface.
- C. Frame: Form of 16 gauge thick steel sheet of depth and configuration to suit material and type of construction where installed. Provide surface mounted units having frame flange at perimeter where installed in concrete, masonry, or existing construction. Weld exposed joints in flange and grind smooth. Provide expanded galvanized metal lath perimeter wings when installed in plastered partitions.
- D. Hinge: Concealed spring hinge to allow panel to open 175 degrees. Provide removable hinge pin to allow removal of panel from frame.
- E. Lock: Cylinder lock, provide 2 keys per panel to match building key system.

2.04 FINISH

- A. Provide in accordance with NAAMM Metal Finishes Manual on exposed surfaces.

- B. Steel Surfaces: Chemically bonded prime coat of baked-on electrostatic powder.

PART 3 - EXECUTION

3.01 LOCATION

- A. Provide wall[, ceiling][, floor] access doors wherever valves, traps, dampers, cleanouts or other control items of mechanical or electrical work are concealed in walls, partitions, or gypsum board or plaster ceiling construction and as indicated on drawings.
- B. Use fire-rated doors in fire-rated partitions and ceilings.
- C. Use flush panel doors in partitions and ceilings, except lay-in acoustical panel ceilings or upward access acoustical tile ceilings.

3.02 INSPECTION

- A. Verify rough openings for door and frame are correctly sized and located.
- B. Beginning of installation means acceptance of existing conditions.

3.03 INSTALLATION

- A. Install frame plumb and level in ceiling openings.
- B. Position to provide convenient access to concealed Work requiring access.
- C. Secure rigidly in place in accordance with manufacturer's instructions.
- D. Install access doors in openings to have sides vertical in wall installations, and parallel to ceiling grid or side walls when installed in ceiling. Set frames so that edges of frames without flanges will finish flush with surrounding finish surfaces. Set frames with flanges to overlap opening and so that face will be uniformly spaced from finish surface. Set access doors recessed so that face of surrounding materials will finish on same plane when door is installed.
- E. Secure frames to adjacent construction using anchors attached to frames or by use of bolts or screws through frame members. Type, size and number of anchoring devices shall be suitable for material surrounding opening, and as required to maintain alignment and resist displacement during normal use of access door and building.
- F. Adjust hardware so that door panel will open freely, and when closed door panel will be centered within frame.
- G. Paint per Section 09 90 00, Painting.

END OF SECTION

SECTION 08 41 13

ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Aluminum doors, frames, glazing components and glazed lights.
- B. Glass panels.
- C. Anchors, brackets and attachments.
- D. Door hardware.
- E. Perimeter sealant.
- F. Related Sections
 - 1. Section 08 71 00 Door Hardware.
 - 2. Section 08 80 00, Glazing

1.02 REFERENCES

- A. ASTM – American Society for Testing and Materials
 - 1. ASTM A36 - Structural Steel.
 - 2. ASTM A123 - Zinc (Hot-Dip Galvanized) coatings on Iron and Steel Products.
 - 3. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape and Tube.
 - 4. ASTM E283 - Rate of Air Leakage through External Windows, Curtain Walls and Doors.
 - 5. ASTM E330 - Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - 6. ASTM E331 - Water Penetration of Exterior Windows, Curtain Walls and Doors.
- B. AAMA - American Architectural Manufacturers Association.
- C. ICC - International Code Council.
- D. CPSC 16 CFR 1201– U.S. Consumer Products Safety Commission, Safety Standard for Architectural Glazing Material, Consumer Protection Safety Commission, Code of Federal Regulations. All glazing shall be tested in accordance with CPSC 16 CFR 1201. Glazing shall comply with the test criteria for Category II as indicated in Table 2406.2(1), 2010 CBC.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements

1. System to provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F without causing detrimental effects to system or components.
2. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with Chapter 24, California Building Code.
3. Uniform Load: A static air design load of 20 psf shall be applied in the positive and negative direction in accordance with ASTM E330. No deflection in excess of L/175 of the span of any framing member up to 13'-6" and L/240 13'-6" and above. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
4. Limit water infiltration to zero at 8 pounds-force per square foot, ASTM E331.
5. Air Infiltration: ASTM E283; maximum .06 cfm per square foot of fixed area when tested at 6.24 pounds per square foot (50 wind speed) [at 1.57 lbs. per sq. ft. (25 wind speed)] static air pressure difference
6. System to accommodate, without damage to system or components, or deterioration of perimeter seal: Movement within system; movement between system and perimeter framing components; dynamic loading and release of loads; and deflection of structural support framing.
7. When a pair of doors is used, one of the doors to provide clear, unobstructed opening 32 inches in width with the door positioned at an angle 90 degrees from its closed position.

1.04 SUBMITTALS

- A. Shop drawings including system and component dimensions; components with in assembly; framed opening requirements and tolerances; anchorage and fasteners; glass and infills; door hardware requirements; and affected related work.
- B. Product data
- C. Manufacturer's installation instructions.
- D. Three samples, illustrating pre-finished aluminum surface and specified glass.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Provide wrapping or strippable coating to protect pre-finished aluminum surfaces.

1.06 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

2. Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.
 3. On access control installations, all wiring to be coordinated with a licensed electrical installer.
- B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.07 WARRANTY

- A. Special Warranty: Provide 5-year Warranty under provisions of Division 01.
- B. Warranty: Include coverage for complete System installation for failure to meet specified requirements.
1. Failures include, but are not limited to the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Adhesive or cohesive sealant failures. Including perimeter sealant installation.
 - d. Air and Water leakage through fixed glazing and framing areas.
 - e. Failure of operating components to function properly.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products of following manufacturers form basis for design and quality intended.
1. Kawneer Company, Inc., Visalia, CA.
 2. EFCO Corporation, Monett, MO.
 3. Vistawall Architectural Products/Oldcastle Glass, Terrell, TX.
 4. Arcadia Inc., Vernon, CA.
 5. Wausau Window and Wall Systems, Wausau, WI.
 6. Graham Architectural Products
- B. Or equal as approved in accordance with Division 01 General Requirements for Substitutions.

2.02 MATERIALS

- A. Extruded Aluminum: ASTM B221; 6063-T6 alloy and temper.

- B. Glazing Gaskets: EPDM elastomeric extrusions.
- C. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements
- D. Steel Reinforcement Sections: ASTM, A36; shapes to suit mullion sections, ASTM A611 for cold-rolled sheets.
- E. Touch-Up Primer for Galvanized Surfaces: Zinc-rich Type.
- F. Fasteners: Stainless steel.
- G. Sealant: per Section 07 92 00 Joint Sealers.

2.03 FABRICATED COMPONENTS

- A. Frames: 1-3/4" x 4-1/2" profile, front glazed unless indicated otherwise. Framing Section Properties in conformance with Wind Load and height requirements.
 - 1. Model:
 - a. Kawneer Trifab VG 451T Thermal with insulating glass; Screw Spline System. Minimum wall thickness of 0.08 inches.
 - b. Or equal in accordance with Division 01, General Requirements
- B. Entrances
 - 1. Kawneer 500 Standard, 1-3/4" thick, 5" wide top rail, 5" wide vertical stiles, minimum 10" high bottom rail. Beveled glazing stops, offset pivtors.
- C. Silicone Partition Closures: ASTM D2000 4GE 709M, Resilient closure between glass to perpendicular abutting walls Type PCS-IF [PCS-I] by Michael Rizza Company, Portland OR.
- D. Corner Mullions: 90 and 135 degree inside and outside corners, refer to drawings.

2.04 GLASS AND GLAZING MATERIALS

- A. Tempered glass: All glazing shall be tested in accordance with CPSC 16 CFR 1201, and comply with the test criteria for Category II as indicated in Table 2406.2(1), 2010 CBC.
- B. Glass in Exterior Lights and Doors: 1" thick insulating, tempered, Low-E glass, as specified in Section 08 80 00.
- C. Glazing: All units shall be "dry" glazed with EPDM gasket on both exterior and interior.

2.05 HARDWARE – DOORS

- A. Applied Stop with weathering: Kawneer No. 69-154.
- B. Sill Sweep Strips: Resilient seal type, Kawneer No. 200-799.

- C. Threshold: Extruded aluminum, one piece per door opening 4 inches wide, 1/2 inch high, Kawneer No. 69-139.
- D. Hinges: Offset pivots for single acting, intermediate pivots for doors 7' and higher. Concealed center pivots for double acting doors and center hung.
- E. Cross Rail: 3-1/2 inch high, Kawneer No. 200-058.
- F. Panic Devices: As specified in Section 08 71 00.
- G. Closer: As specified in Section 08 71 00.
- H. Cylinder Lock: As specified in Section 08 71 00.
- I. Weatherstripping:
 - 1. Meeting stiles on pairs of doors: adjustable astragal utilizing wool pile with polymeric fin.
 - 2. Single acting door and frame: thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
- J. Provide EPDM or vinyl-blade gasket weather-stripping in bottom of door rail, adjustable for contact with threshold.

2.06 FABRICATION

- A. Fabricate doors and frames allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation. Door corner construction shall consist of mechanical clip fastening, Shielded Inert Gas Metal Arc deep penetration plug welds and 1-1/8" long fillet welds inside and outside of all four corners.
- B. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline and weatherproof.
- C. Develop drainage holes with moisture pattern to exterior.
- D. Prepare components to receive anchor devices. Fabricate anchorage items.
- E. Arrange fasteners, attachments and jointing to ensure concealment from view.
- F. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.

2.07 FINISHES

- A. Extruded Aluminum Surfaces: Color Anodized AA-M12C22A44, Architectural Class I (.7 mils minimum), AAMA 611.
- B. Concealed Steel Items: Galvanized in accordance with ASTM A123 primed with zinc-rich paint.

- C. Apply two coats of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

2.08 SOURCE QUALITY CONTROL

- A. Source Quality: Provide aluminum entrances specified herein from a single source.
- B. Fabrication Tolerances: Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.
- B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

- A. Install doors, frames, glazing and hardware in accordance with manufacturer's instructions.
 - 1. Install doors and hardware in accordance with manufacturer's printed instructions.
 - 2. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weather-tight construction.
- B. Use anchorage devices to securely attach frame assembly to structure.
- C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- D. Coordinate attachment and seal of air and vapor barrier materials.
- E. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.
- G. Install glass and infill panels in accordance with Section 08 80 00, using exterior manufacturer's standard extruded glazing gaskets [using structural glazing].
- H. Install perimeter two component polyurethane type sealant, backing materials, and installation requirements in accordance with Section 07 92 00. Color shall match adjacent aluminum finish.
- I. Adjust operating hardware.

- J. Install Partition Closures at voids between glazing system and abutting walls.

3.03 TOLERANCES

- A. Variation from Plane: 0.03 inches per foot maximum or 0.25 inches per 30 feet, whichever is less.
- B. Misalignment of Two Adjoining Members Abutting in Plane: 0.015 inches.

3.04 ADJUSTING

- A. Test door operating functions. Adjust closing and latching speeds and other hardware in accordance with manufacturer's instructions to ensure smooth operation.

3.05 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Hardware for doors
 - 2. Weatherstripping and thresholds
 - 3. Gasketing and silencers
 - 4. Keyed cylinders for the work of others
- B. Related Sections
 - 1. Section 06 20 00, Finish Carpentry
 - 2. Section 06 41 16, Casework
 - 3. Section 08 12 13, Hollow Metal Frames, Welded
 - 4. Section 08 13 13, Hollow Metal Doors
 - 5. Section 08 14 13, Flush Wood Doors
 - 6. Section 08 41 13, Aluminum Entrances and Storefronts
 - 7. Section 08 44 13, Aluminum Framed Curtainwalls
 - 8. Section 09 29 00, Gypsum Board

1.02 REFERENCES

- A. ADA – Americans with Disabilities Act of 1990
 - 1. ADA Standards – ADA Title III Regulations and their referenced DOJ Standards for Accessible Design
- B. ANSI - American National Standards Institute
BHMA - Builders Hardware Manufacturers Association
 - 1. ANSI/BHMA A156.18 - Materials and Finishes
- C. CACRM - California Access Compliance Reference Manual, updated and based on 2010 California Building Code
- D. CBC – 2010 California Building Code (CCR Title 24, Part 2 as adopted and amended by DSA)
 - 1. CBC 10 - Chapter 10, Means of Egress
 - 2. CBC11B – CBC Chapter 11B, Access to Public Buildings, Public Accommodations, Commercial Facilities and Publicly Funded Housing
- E. CRSC - California Referenced Standards Code (CCR Title 24, Part 12)
 - 1. CRSC-7A.2 - Standard 12-7A-2, Exterior Windows
 - 2. CRSC-7A.4 - Standard 12-7A-4 Fire Resistive Standards, Fire Door Assemble Tests
 - 3. CRSC-10.2 - Standard 12-10-2 Single Point Latching or Locking Devices
 - 4. CRSC-10.3 - Standard 12-10-3 Emergency Exit and Panic Hardware

- F. DHI - Door and Hardware Institute
 - 1. DHI-02 - Installation Guide for Doors and Hardware
 - 2. DHI-03 - Keying Systems and Nomenclature
- G. MIL-R - Military Reference
 - 1. MIL-R-6130 - Rubber, Cellular, Chemically Blown
 - 2. MIL-R-6855/3 - Rubber, Synthetic, Rods (or Rounds)
- H. [NFPA - National Fire Protection Agency
 - 1. NFPA 80 - Fire Doors and Fire Windows
 - 2. NFPA 101 - Life Safety Code
 - 3. NFPA 105 - Smoke Control Door Assemblies]
- I. UL - Underwriters' Laboratories, Inc.
 - 1. UL Directory - UL Fire Resistive Materials Directory

1.03 SUBMITTALS

A. Action Submittals

- 1. Product Data for each hardware set component and accessory item
- 2. Shop Drawings indicating locations and mounting heights of each type of hardware
- 3. Hardware Schedule. Submit a complete Hardware Schedule, signed by the distributor's AHC, following the procedures in this Manual for Product Data. The Schedule shall include the following information; coordinate with the Schedules required under Sections 08 12 13, 08 13 13, 08 14 13.
 - a. Hardware Group identification; use the same numbers and sequence as this Manual
 - b. Completely describe door and frame features and list by related Room Opening Numbers, use the same numbers as Architect's Construction Documents
 - c. Identify each hardware item by manufacturer, model or brand name, and catalog number
 - d. Indicate size or duty rating and finish of each item
 - e. Indicate lock function, type, and style
 - f. Indicate fire-rating, lead lining or other special features
 - g. Provide a legend on each page explaining the abbreviations and symbols used within schedule
 - h. Product Data. Attach a Product Data sheet for each hardware item in the Schedule, include wiring diagrams for each electrified product; coordinate with electrical before submitting.
- 4. Keying Schedule. Upon acceptance of Hardware Schedule, develop Keying Schedule in consultation with Owner. Submit following the procedures for Product Data.

B. Information Submittals

- 1. Manufacturers' parts lists, templates, and installation instructions.
- 2. Manufacturers' certificates of compliance regarding specified fire-ratings.

C. Closeout Submittals

1. Operation and Maintenance Manuals. Include Product Data on operating hardware, and manufacturer's recommended procedures and schedule for lubrication and inspection procedures related to preventative maintenance. Include a copy of the accepted hardware schedule and key biting list.
2. Executed Warranties

1.04 QUALITY ASSURANCE

- A. Manufacturers: companies with a minimum of 10-years experience manufacturing door hardware for commercial projects similar in scale and complexity to those required for this Project.
- B. Hardware Supplier: company with at least 6-years experience scheduling and supplying door hardware for commercial projects similar in scale and complexity to those required for this Project.
1. Company shall be a factory-direct, contract-supplier
 2. Company shall employ and assign at least one Architectural Hardware Consultant (AHC) to be in responsible charge of the Hardware Schedule development and provide the Field Quality Assurance services specified in this Section.
- C. Supplier's AHC: DHI certified Architectural Hardware Consultant (AHC) with minimum 3-years' experience scheduling and inspecting commercial hardware installations for projects similar in scale and complexity to those required for this Project. AHC shall be authorized to act on behalf of Supplier, qualified to render judgments on progress of work, able to make recommendations to adapt installations to field conditions and to certify installation as in compliance with Contract requirements.
- D. Items specified as "no substitutions" are intended to match existing similar items.
- E. Regulatory Requirements
1. Materials shall conform to CBC-10, CBC-11B, CRSC-12-7-4 and NFPA 80 for requirements applicable to fire-rated doors and frames.
 2. Materials shall conform to CBC-11B, Sections 1133B.2.1 and 1133B.2.5.2 and CBC-10, Sections 1008.1.1.1 and 1008.1.8.2 for positioning for accessibility.
 3. Thresholds shall comply with CBC-10, Section 1008.1.6 and CBC-11B, Section 1133B.2.4.1.
 4. Materials for fire-rated and exit doors shall conform to the applicable sections of NFPA 101 and NFPA 105, and CBC-10.
 5. Provide UL labels on exit devices for fire-rated openings.
- F. Keying Conference. Upon acceptance of Hardware Schedule, Hardware Supplier shall arrange for and convene a conference with the Owner to confirm keying requirements.
1. Convene the Conference sufficiently in advance of hardware installation to cause no delay in the orderly progress of the work.
 2. Give Architect at least 10-days advance notice of Conference schedule and agenda.
 3. Contractor shall conduct the Conference as specified in Division 01, General Requirements, for project administration.

- G. Pre-Installation Conference. Convene Conference at least two weeks prior to beginning installation of this work.
 - 1. Give Architect at least 10-days advance notice of Conference schedule and agenda.
 - 2. Contractor shall conduct the Conference as specified in Division 01, General Requirements, for project administration.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Package hardware items individually by doors, group small items together, label and identify package with door opening code to match hardware schedule. Identify location of each door opening. Deliver in strong, sturdy containers.
- B. Deliver keys to Owner by security shipment direct from hardware supplier.
- C. Protect hardware from theft by cataloging and storing in dry, secure area.

1.06 PROJECT REQUIREMENTS

- A. Coordinate work of this Section with manufacturing of doors, frames and other work, conducted under other Sections, that is reinforced for door hardware.
- B. Although several manufacturers are listed as acceptable, obtain each kind of hardware (latch- and lock-sets, exit devices, hinges, closers, etc.) from only one manufacturer.
- C. Furnish items of hardware required to complete this work in accordance with these Specifications and the manufacturers' instructions. Provide hardware items required for the proper operation of each door, whether or not specified in this Section. Items provided that are not expressly specified shall be commensurate in quality and type to related specified items.
- D. Where hardware items specified are not adaptable to the finished shape or size of the members for which they are specified, submit, for Architect's approval, suitable alternatives having the same operation and quality as the items specified.
- E. Exit Doors shall be operable at all times from the inside without the use of a key or any special knowledge or effort.
- F. Fire-Rated Openings. Provide hardware for fire-rated openings in compliance with NFPA 80-2007. This requirement takes precedence over other specified requirements for such hardware. Provide only devices that have been tested and listed by UL for the type and size of each door required, and that comply with the labeling requirements of the door and door frame. Latching hardware, door closers, ball bearing hinges, and seals are required whether listed in the Hardware Schedule or not.
 - 1. Where exit devices are required on fire-rated doors, provide supplementary marking on the door's UL Label indicating DOOR IS FIRE-RATED - FIRE RATED EXIT HARDWARE REQUIRED, and
 - 2. UL label on exit device shall indicate FIRE EXIT HARDWARE.
 - 3. [Where required by authorities having jurisdiction, provide a readily, durable sign on or adjacent to door stating, DOOR TO REMAIN UNLOCKED WHENEVER THE BUILDING IS OCCUPIED.
 - a. Sign letters shall be minimum 1-inch high and have minimum 70-percent contrast with their background.]

4. Hardware for smoke-control doors shall be in accordance with NFPA 105.

G. Electronic Security Hardware. Coordinate installation of the electronic security hardware with the Architect, and provide installation and technical data to the Architect and other related Sections. Upon completion of electronic security hardware installation, verify that all components are working properly, and state in the required guarantee that this inspection has been performed.

1.07 EXTENDED WARRANTIES

A. Manufacturer shall warrant the installed hardware to be and to remain free from defect in material and workmanship for the periods listed below. Upon written notice from the Owner, the manufacturer shall promptly, without cost and with minimum inconvenience to Owner correct said deficiencies. Manufacturer may service or replace defective work at its option, provided the opening is restored to like-new operation. This guarantee does not cover defect due to lack of maintenance or abnormal or abusive use after Date of [Certified] [Substantial] Completion, provided that the manufacturer has demonstrated its recommended maintenance procedures to the Owner's personnel.

1. Warrant Door Closers for at least [10] years.
2. Warrant Locksets for at least [7] years
3. Warrant Exit Devices for at least [7] years.
4. Warrant other hardware items for at least [2] years.

1.08 MAINTENANCE

A. Extra Materials. Provide, as extra materials, one complete set of special or proprietary wrenches and tools required for the proper maintenance and adjustment each hardware component supplied. Tools shall be by or as recommended by hardware component manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers

| PRODUCT | ACCEPTABLE MANUFACTURERS | | | |
|--------------------|--------------------------|----------------|----------|--------|
| Hinges | McKinney | Hager | Bommer | |
| Continuous Hinges | Markar | McKinney | Pemko | |
| Lock- / Latch-sets | Sargent | Corbin Russwin | Yale | |
| Exit Devices | Sargent | Corbin Russwin | Yale | |
| Cylinders | Sargent | Corbin Russwin | Yale | |
| Closers | Sargent | Corbin Russwin | Yale | Norton |
| Push/Pull/Kick PI | McKinney | Rockwood | Trimco | |
| O.H. Stops | Sargent | Rixson | Rockwood | |
| Door Stops | McKinney | Rockwood | Trimco | |
| Silencers | McKinney | Rockwood | Trimco | |
| Weatherstripping | McKinney | Pemko | Reese | |

1. Or equal, approved in accordance with Division 01 requirements for substitutions.

2.02 MATERIALS

- A. Hinges. Hinge open widths shall be sufficient size to permit door to swing 180 degrees. Furnish hinges with steel pins and flush bearings.
1. Drawing typically depict doors at 90 degrees; doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise Architect if 8-inch width is insufficient.
 2. Provide 3 hinges per door leaf up to 7 foot 6 inch height. Add one additional hinge for each additional 30 inches in door height or fraction thereof.
 3. At out-swinging exterior doors, provide hinges with non-removable (NRP) pins.
 4. Floor hinges shall have maximum degree dead stop permitted by trim of adjacent structure. Furnish special pins and longer spindles as may be required.
- B. Continuous Hinges: All hinges to be made of extruded 6063-T6 aluminum alloy with thrust bearings. Hinge line to be available in concealed flush mount with or without inset, full surface and half surface types as specified in the hardware sets. Furnish wide throw hinges as required to clear trim permitting doors to open 180 degrees. Continuous hinges to be fire-rated 20, 45 & 90 minutes when incorporated into door and frame labeled installations without necessitating the use of fusible link pins. All hinges to be available in standard and extra heavy duty weight mortise and side throw where required. All hinges to be factory cut for door size.
- C. Lock- and Latch-Sets: Sargent heavy-duty mortise sets, uniform in size regardless of lock function.
1. Strikes shall be 16 gage curved steel, bronze, or brass with 1-inch deep box construction, and have lips of sufficient length to clear trim and protect clothing.
 2. Latchbolts shall have minimum 3/4-inch throw.
 3. Comply with requirements of local security ordinances.
 4. Provide approved fusible links at levers for labeled doors.
 5. Lock Functions scheduled in Part 3 of this Section have the following meanings.
 - a. 37: Classroom lock, meeting ANSI A156 F-05; always free both sides unless outside lever is locked by key
 - b. 04: storeroom lock, outside lever always rigid, inside lever always free, ingress by key, unless scheduled otherwise, meeting ANSI A156 [F-07]
- D. Exit Devices (Panic Hardware): operable without ability to grasp to open door in accordance with CBC 1133B.2.5.2. Devices shall be non-handed, and in compliance with CBC-10, Sections 1008.1.8.2.1 and 1008.1.9 and CRSC-12-10-3 and have deadlocking latchbolt. Latchbolt may be able to be dogged-down with special tool or key from interior.
1. Push-pad type devices shall have stainless-steel pads.
 2. Lever handle trim, where provided, shall match locksets.
 3. Furnish devices for wood doors with sex bolts unless otherwise specified.
 4. Deadlocking latchbolt shall be interconnected with latching mechanism.
 5. [Furnish devices for wood doors with sex bolts unless otherwise specified].
 6. [Deadlocking latchbolt shall be interconnected with latching mechanism (automatic)].
 7. Devices for fire rated doors shall have label that reads "Fire Exit Hardware".

- E. Cylinders: keyed to Owner's existing system. Do not use permanent keying for construction purposes.
- F. Door Closers: full rack-and-pinion type with full, architectural, removable, non-ferrous case. Place closers inside building, stairs and rooms. Closers shall be non-handed, non-sized and adjustable to operate with maximum 5-lbf.
 - 1. At exterior doors and at interior fire rated doors, provide size 2 through 6, unless scheduled otherwise.
 - 2. At interior non-rated doors, provide size 1 through 4, unless scheduled otherwise.
 - 3. Authorities Having Jurisdiction may increase the force required to open fire-rated doors, if necessary to ensure positive latching but, in no case shall the required pressure, applied in the direction of exit travel, exceed 15 lbf in accordance with CBC 11B, Section 1133B.2.5.
 - 4. Where parallel arm closers are required for doors with fixed panels over, provide flush transom offset brackets.
 - 5. At narrow head rails, provide drop brackets.
 - 6. Closer sweep period shall be adjustable so that from 70 degree open position, it will take door at least 3-seconds to arrive at a point 3-inches from latch, measured to the leading face of door, Section 1133B.2.5.1.
 - 7. Units shall comply with CBC-11B, Section 1133B.2.5.1 for closer delay time.
 - 8. [Furnish with sex bolts and grommets for mounting to wood doors.]
- G. Door Stops. Provide stops for every door to prevent damage to adjoining surfaces in path of door swing. Provide concave, resilient wall stops unless indicated or scheduled otherwise.
 - 1. Where the door would contact equipment, casework, or other obstruction before the adjoining wall, provide an over-head stop. Use concealed type unless surface mounted is required for fire-label requirements.
- H. Kick Plates: 0.050-inch, sheet metal, 10-inches high with four beveled edges. Furnish with machine or wood screws of bronze or stainless steel to match other hardware.
 - 1. For single-leaf door openings, plate width: 2-inches less than door leaf
 - 2. For pairs of doors without mullion, plate width: 1-inch less than door leaf
 - 3. For pairs of doors with edge guards, plate width: 1-1/2-inches less than door leaf
- I. Silencers: Rockwood No. 608, or equal. Furnish unless seals or weatherstripping are scheduled in Part 3 of this Section.
 - 1. Furnish, 3 on jambs of doors.
 - 2. Furnish 1 at head of each leaf at double doors.
- J. Weatherstripping. Where Hardware Set, as scheduled in Part 3 of this Section, includes "weatherstripping" provide a complete set of the following.
 - 1. Thresholds: comply with CBC-10 Section 1008.1.6, CBC-11B Section 1133B.2.4.1 and the following.
 - a. Exterior Thresholds: maximum height of 1/2-inch, with beveled edges
 - b. Interior Thresholds: maximum height of 1/4-inch, with beveled edges
 - 2. Door Sweep
 - 3. Head and Jamb Frame Weatherstripping

4. Mastic: butyl-rubber or polyisobutylene as specified in Section 07 92 00; furnish with primers, and accessories recommended by manufacturer for each condition.

2.03 FASTENERS

- A. Fasteners shall be as furnished or recommended by item manufacturer for each condition. Furnish machine screws for metal substrate, and wood screws for wood.
 1. Fastener base metal and finish shall match hardware with which they're used.
 2. For strikes, faceplates, and similar items furnish suitable screws.
 3. For butt hinges, furnish flathead, countersunk, full-thread screws.
 4. For closer bases or closer shoes mounted to doors, furnish bolts.
 5. Screws: phillips head.
- B. Threshold Anchors: 1/4-inch diameter, non-ferrous bolts with lead expansion shield, Red-Head No.SFS-1420 Flat Head Sleeve Anchors (SS/FHSL), or equal.
- C. Do not use self-drilling, self-tapping screws, unless furnished by hardware manufacturer for the specific condition, or for mounting flat-goods (push-plates, kick-plates, etc.).

2.04 KEYING

- A. Keying Schedule shall comply with DHI-03 for keying systems and nomenclature.
- B. Door Locks: Master keyed, Grand master keyed including construction keying/control keying for core removable cylinders per Owner's requirements
- C. Supply 3 keys for each lock.
- D. Supply keys in the following quantities:
 1. [5] master keys.
 2. [5] grand master keys.
 3. [10] construction keys.
 4. [2] control keys and [3] extra cylinder cores.

2.05 FINISHES

- A. Finish: BHMA A156.18, No. [[626 - Dull Chrome]], unless indicated or scheduled otherwise.
 1. In areas using BHMA No.626 finish, door pulls and push-bars, and push- and kick-plates shall be BHMA 630 stainless steel.
 2. Paint door closer housings to match other hardware unless indicated otherwise.
- B. Finishes shall conform to the following standards and symbols.

| | Finish/Description | US Symbol | BHMA No. |
|----|------------------------|-----------|----------|
| 1. | Prime Coat | PC | 600 |
| 2. | Satin Chromium | 26D | 626 |
| 3. | Satin Stainless Steel | 32D | 630 |
| 4. | Clear Anodized | 28 | 628 |
| 5. | Dull Chromium on Steel | --- | 652 |
| 6. | Spray Paint Aluminum | --- | 689 |

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that doors and frames are ready to receive this work and that dimensions are as indicated on shop drawings.
- B. Verify that power supply is available to electrified devices.
- C. [Inspect Project to verify the extent of the finish hardware required to complete the work. Where there is a conflict between this Specification and the existing hardware, provide new finish hardware as specified in this Section.
- D. Do not begin installation until unsatisfactory conditions are corrected. Beginning installation means acceptance of existing conditions and preparatory work of others.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturers' instructions; using templates, fasteners, and supplies provided by or as recommended by item manufacturer and as follows. Conform to CBC11B, Sections 1133B.2.1 and 1133B.2.5.2 for accessibility requirements and to CBC-10 Sections 1003.3.1 and 1008.1.9.
 - 1. Hinges
 - a. Top hinge: 5 inches down from head of opening to top of hinge
 - b. Bottom hinge 10 inches up from door bottom to bottom of hinge
 - c. Intermediate hinges: spaced equally between top and bottom hinges
 - 2. Locksets: 40-5/16 inches from floor to centerline of lever handle.
 - 3. Exit Devices: [36- to 44] [40-5/16]-inches to bottom of bar or touch pad.
 - 4. Adjust door closers to have maximum opening resistance pressure as follows.
 - a. Interior Doors, other than fire doors: 5 pounds pressure (maximum)
 - b. Exterior Doors, other than fire doors: 5 pounds pressure (maximum)
 - c. Fire Doors. Authorities Having Jurisdiction may increase the effort required to operate door, if necessary to achieve positive latching, subject to 15-lbf maximum.
 - 5. Resilient Wall Stop, locate to intercept door handle
 - 6. Kick Plates. Set plates level, approximately 1/8-inch above bottom of door and as follows.
 - a. Tops of plates visible collectively shall be in accurate alignment.
 - b. At single-leaf door: center plate on door leaf
 - c. At pairs of doors without mullion, set 1/2-inch from leading edge of door
 - d. At pairs of doors with edge guards, set 1-1/2-inches less than door leaf
 - 7. Exterior Thresholds. Set in full bed of mastic. Secure with non-ferrous fasteners.
 - 8. Interior Thresholds at sound control openings. Set in bed of mastic.
- B. After fitting hardware to doors, remove all finish hardware, carefully replace in properly marked boxes, and place in storage until painting and finishing is completed. After painting and finishing is completed, permanently install finish hardware. Comply with DHI-02 for installation of hardware.
- C. Secure finish hardware with manufacturer's fasteners.

- D. Provide expansion anchors for attaching hardware items to concrete or masonry as specified in Division 01.
- E. Make provisions to prevent screws from working loose by using silicone sealant applied to screw tips, or other approved methods.

3.03 FIELD QUALITY ASSURANCE

- A. Completion Inspection. Hardware supplier's AHC shall provide the on-site services required to execute the specified warranties but, at least as follows. Prepare a written report upon the completion of each task.
 - 1. Attend the Pre-Installation Conference
 - 2. Observe the progress of the work
 - 3. Upon completion, inspect the work to verify hardware is complete and properly adjusted in accordance with both the Contract Documents and final Shop Drawings.
 - 4. Report findings, in writing, outlining corrective actions and recommendations; append executed warranties.

3.04 FINISH HARDWARE SETS

Hardware Schedule

Set: 1.0

| | | | |
|----------------------------------|------------------------------|---------|----|
| 2 Continuous Hinge | CFM HD1 | | PE |
| 1 Exit device (CVR, exit only) | 11 NB 16 43 AD8410 | 630 | SA |
| 1 Concealed Vert Rod Exit | 11 NB 16 43 AD8406 Less Trim | 630 | SA |
| 2 Pull | RM3040-12 | 629/630 | RO |
| 2 Concealed Overhead Holder/Stop | 698S | EN | SA |
| 2 Door Closer (surface) | 351 P10 351D | EN | SA |
| 1 Threshold | Per Sill Detail | | PE |
| 1 Rain Guard | 346C | | PE |
| 2 Sweep | 18062CNB | | PE |

Notes: Weatherstripping and Astragal by Aluminum Door Supplier

Set: 2.0

| | | | |
|----------------------------------|------------------------------|---------|----|
| 1 Exit device (CVR, exit only) | 11 NB 16 43 AD8410 | 630 | SA |
| 2 Continuous Hinge | CFM HD1 | | PE |
| 1 Concealed Vert Rod Exit | 11 NB 16 43 AD8406 Less Trim | 630 | SA |
| 2 Pull | RM3040-12 | 629/630 | RO |
| 2 Door Closer (surface) | 351 P10 351D | EN | SA |
| 2 Concealed Overhead Holder/Stop | 698S | EN | SA |

Notes: Balance of material by Aluminum Door Supplier

Set: 3.0

| | | | |
|----------------------------------|-------------------|-----|----|
| 1 Continuous Hinge | CFM HD1 | | PE |
| 1 Exit Device | 11 16 43 8804 ETL | 630 | SA |
| 1 Concealed Overhead Holder/Stop | 698S | EN | SA |
| 1 Door Closer (surface) | 351 P10 | EN | SA |
| 1 Kick Plate | K1050 10" 4BE CSK | 630 | RO |
| 1 Threshold | Per Sill Detail | | PE |
| 1 Rain Guard | 346C | | PE |
| 1 Sweep | 18062CNB | | PE |
| 1 Gasketing | 2891APK | | PE |

Set: 4.0

| | | | |
|----------------------------|------------------------|-----|----|
| 3 Hinge | TA2714 4-1/2" x 4-1/2" | 626 | MK |
| 1 Mortise Lock (classroom) | 11 8237 LNL | 626 | SA |
| 1 Door Closer (surface) | 351 O | EN | SA |
| 1 Kick Plate | K1050 10" 4BE CSK | 630 | RO |
| 1 Mop Plate | K1050 6" 4BE CSK | 630 | RO |
| 1 Wall Stop | 403 | 626 | RO |
| 3 Silencer | 608 | | RO |

Set: 5.0

| | | | |
|----------------------------------|---------------------------|---------|----|
| 1 Continuous Hinge | CFM HD1 | | PE |
| 1 Rim Exit Device | 11 16 43 AD8504 Less Trim | 630 | SA |
| 1 Pull | RM3040-12 | 629/630 | RO |
| 1 Concealed Overhead Holder/Stop | 698S | EN | SA |
| 1 Door Closer (surface) | 351 P10 351D | EN | SA |

Notes: Balance of materials by Aluminum Door Supplier

Set: 6.0

| | | |
|---|----------------------------|--------|
| 3 Hinge | TA2714 NRP 4-1/2" x 4-1/2" | 626 MK |
| 1 Mortise Lock (storeroom) | 11 8204 LNL | 626 SA |
| 1 Door Closer (surface w/stop & holder) | 351 CPSH | EN SA |
| 1 Kick Plate | K1050 10" 4BE CSK | 630 RO |
| 3 Silencer | 608 | RO |

Set: 7.0

| | | |
|------------|------------------|--------|
| 1 Cylinder | 11-41 (as req'd) | 626 SA |
|------------|------------------|--------|

Notes: Door, Frame and Hardware by Glass Door Mfr

Set: 8.0

| | | |
|----------------------------|------------------------|--------|
| 3 Hinge | TA2714 4-1/2" x 4-1/2" | 626 MK |
| 1 Mortise Lock (storeroom) | 11 8204 LNL | 626 SA |
| 1 Door Closer (surface) | 351 O | EN SA |
| 1 Kick Plate | K1050 10" 4BE CSK | 630 RO |
| 1 Wall Stop | 403 | 626 RO |
| 3 Silencer | 608 | RO |

Set: 9.0

| | | |
|---|----------------------------|--------|
| 3 Hinge | TA2714 NRP 4-1/2" x 4-1/2" | 626 MK |
| 1 Mortise Lock (classroom) | 11 8237 LNL | 626 SA |
| 1 Door Closer (surface w/stop & holder) | 351 CPSH | EN SA |
| 1 Kick Plate | K1050 10" 4BE CSK | 630 RO |
| 3 Silencer | 608 | RO |

Set: 10.0

| | | |
|------------------------------------|----------------------------|--------|
| 3 Hinge | TA2714 NRP 4-1/2" x 4-1/2" | 626 MK |
| 1 Mortise Lock (storeroom) | 11 8204 LNL | 626 SA |
| 1 Door Closer (surface, hold open) | 351 PH10 | EN SA |
| 1 Kick Plate | K1050 10" 4BE CSK | 630 RO |
| 1 Wall Stop | 403 | 626 RO |
| 3 Silencer | 608 | RO |

Set: 11.0

| | | |
|------------|------------------|--------|
| 1 Cylinder | 11-41 (as req'd) | 626 SA |
|------------|------------------|--------|

Notes: Existing Door, Frame and Hardware to remain

Set: 12.0

| | | |
|------------|------------------|--------|
| 1 Cylinder | 11-41 (as req'd) | 626 SA |
|------------|------------------|--------|

Notes: Door, Frame and hardware by Door Mfr

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Glass Glazing
 - 2. Mirrors
 - 3. Glazing Accessories
- B. Related Requirements
 - 1. Section 08 41 13, Aluminum Entrances and Storefronts
 - 2. Section 10 22 43, All-Glass Interior Partitions
 - 3. Section 09 06 00, Schedules for Finishes
 - 4. Energy calculations or prescriptive compliance documents

1.02 REFERENCES

- A. AAMA – American Architectural Manufacturers Association
 - 1. 800 Voluntary Specifications and Test Methods for Sealants
- B. ANSI – American National Standards Institute
 - 1. Z97.1 Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test
- C. ASCE – American Society of Civil Engineers
 - 1. 7 Minimum Design Loads for Buildings and Other Structures
- D. ASTM International (formerly American Society for Testing and Materials)
 - 1. C 509 Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material
 - 2. C 864 Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
 - 3. C 920 Standard Specification for Elastomeric Joint Sealants
 - 4. C 1036 Standard Specification for Flat Glass
 - 5. C 1048 Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass
 - 6. C 1087 Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems
 - 7. C 1115 Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories

8. C 1281 Standard Specification for Preformed Tape Sealants for Glazing Applications
9. C 1376 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass
10. C 1503 Standard Specification for Silvered Flat Glass Mirror
11. E 283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
12. E 1300 Standard Practice for Determining Load Resistance of Glass in Buildings
13. E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation

E. CFR – United States Code of Federal Regulations

1. 16 CFR 1201 Safety Standard for Architectural Glazing Materials

F. IGCC – Insulating Glass Certification Council

1. Certified Products Directory

G. IGMA – Insulating Glass Manufacturers Alliance

1. North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use

H. GANA – Glass Association of North America

1. Glazing Manual

I. NFRC – National Fenestration Rating Council

1. 400 Procedure for Determining Fenestration Product Air Leakage
2. PCP Product Certification Program

1.03 SUBMITTALS

A. Product Data: For each product and material indicated.

B. Glazing Schedule: List glazing material type, size, and thickness for each opening and application.

C. Shop Drawings: Showing complete details of the proposed setting methods, mullion details, edge blocking, size of openings, frame details, materials, and types and thickness of glass.

D. Samples

1. Minimum 8 x 10 inch samples of each type and color of glass product.
2. Minimum 12 inch length of each type and color of glazing accessory.
 - a. Install sealants between two strips of material representative in color of the adjoining framing system.

- E. Structural Design Calculations
 - 1. Subject to review and approval by the authority having jurisdiction; refer to Division 01, General Requirements for Deferred Approvals.
- F. Test and Evaluation Reports
- G. Manufacturer's Instructions: If any special handling or installation requirements.
- H. Qualification Statements
 - 1. Fabricator
 - 2. Installer

1.04 QUALITY ASSURANCE

- A. Qualifications
 - 1. Manufacturer: Company specializing in manufacture of clear, tinted, coated, and other glass products with 10 years minimum successful experience on work of similar scope.
 - 2. Fabricator: Company accepted in writing by the manufacturer and, where applicable, certified by the manufacturer, with not less than five (5) years experience on work of similar scope.
 - 3. Installer: Company with not less than five (5) years experience on work of similar scope, employing personnel for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Certifications
 - 1. NFRC permanent and temporary labels or label certificates in accordance with NFRC PCP.
- C. Preconstruction Testing
 - 1. Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - a. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - b. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - c. Test no fewer than eight samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - d. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

- e. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.
- C. Recycle or dispose of packaging waste as specified in Section 01 74 19 – Construction Waste Management.

1.06 FIELD CONDITIONS

- A. Do not perform glazing work if temperature is below 50 degrees F, or during damp or rainy weather.

1.07 WARRANTY

- A. Coated glass: 10 year manufacturer's warranty against peeling, cracking, or deterioration of coating.
- B. Insulating glass units: 10 year fabricator's warranty against seal failure and interpane dusting, misting, and filming.
- C. Mirror glass: 5 year manufacturer's warranty against peeling, cracking, and deterioration of coating.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Thicknesses indicated are minimums; provide glass in greater thicknesses as needed to comply with indicated requirements.
 - 1. Thicknesses indicated by traditional designation in fractional inches according to ASTM C 1036.
 - 2. Thicknesses indicated for insulating glass units are from outside face to outside face, inclusive of glass lites, films, and air space(s).

B. Performance Requirements

1. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
 - a. Provide glass in accordance with ASTM E 1300, based on design loads in accordance with ASCE 7.
 - b. Thermal movement design conditions:
 - 1) Ambient temperature range: 120 degrees F
 - 2) Material surfaces range: 180 degrees F
2. Energy Characteristics: For exterior glazing, provide glass products with appropriate center-of-glass values to qualify the completed glazed assemblies for certification as follows:
 - a. Certified U-Factor and SHGC of completed glazed assemblies shall not exceed those required in the energy calculations or prescriptive energy compliance documents included in the Contract Documents.
 - b. Fenestration products and exterior doors shall have air infiltration rates not exceeding 0.3 cfm/ft.² of window area, 0.3 cfm/ft.² of door area for nonresidential single doors (swinging and sliding), and 1.0 cfm/ft.² for nonresidential double doors (swinging), when tested according to NFRC-400 or ASTM E 283 at a pressure differential of 75 pascals or 1.57 pounds/ft.².
 - c. Completed exterior glazed assemblies shall be certified in accordance with NFRC PCP.

C. Identification

1. Each lite of glazing shall bear permanent manufacturer's or fabricator's mark designating type and thickness, readable from inside of building after installation.
 - a. Markings may be acid etched, sand blasted, ceramic fired, or laser etched in the glass, in the lower left or lower right corner.
 - b. Identification of insulating glass units may be on the spacer if clearly readable.
2. In addition, permanent identification of each piece of safety glazing shall include the manufacturer or installer's certification that it meets the requirements for safety glazing.
3. Each lite of fire-rated glazing shall also include in its permanent identification the rating, identification of the rating/listing agency, and test standard used.
4. Factory-built exterior fenestration products shall bear both permanent and temporary labels in accordance with NFRC PCP; temporary labels shall not be removed until after inspection and shall be forwarded to the Owner with closeout submittals.

- D. All glass materials shall have minimum 20 percent recycled content.

2.02 FLAT GLASS

- A. Manufacturers: Subject to compliance with requirements, provide products from one of the following:
 - 1. AGC Flat Glass North America, Inc., Alpharetta, GA
 - 2. Guardian Industries Corp., Auburn Hills, MI
 - 3. Pilkington North America, Inc., Toledo, OH
 - 4. PPG Industries, Inc., Pittsburgh, PA
 - 5. Or equal as approved in accordance with Division 01, General Requirements for Substitutions.

- B. Clear Glass: ASTM C 1036, Type I, Class 1, Quality-Q3, heat-treated in accordance with ASTM C 1048, Kind HS, Condition A or C.
 - 1. Non-heat-strengthened glass may be used if it is the standard glazing type for manufactured units specified elsewhere.

- C. Tinted Glass: ASTM C 1036, Type I, Class 2, Quality-Q3, heat-treated in accordance with ASTM C 1048, Kind HS, Condition A or C, color(s) as scheduled in Section 09 06 00.

- D. Patterned Glass: ASTM C 1036, Type II, Class 1 (Clear) or Class 2 (Tinted), Quality-Q5, Form 3, Finish F1 or F2, Pattern(s) P4 as scheduled in Section 09 06 00.

2.03 TEMPERED GLASS

- A. Comply with safety glazing standards of 16 CFR 1201, Class II, and ANSI Z97.1.

- B. Tempered Glass: Flat glass as specified above, heat-treated in accordance with ASTM C 1048, Kind FT.

2.04 INSULATING GLASS UNITS

- A. IGCC Certified units in accordance with ASTM E 2190.
 - 1. Fabricate using glass types specified above, and fabricator's standard spacers and sealants.
 - 2. Units shall include low-emissivity coatings in accordance with ASTM C 1376, on either 2nd or 3rd surface, and may include argon or other gas fill, as required to produce the performance characteristics specified.
 - 3. Fabricate tinted units with tinted glass for the outboard lite and clear glass for the inboard lite.
 - 4. Fabricate tempered insulating units with tempered glass lite on the side exposed to human impact loads, or both lites if exposed from both sides.

2.05 MIRRORS

- A. Mirror Glass: Clear glass, ASTM C 1036, Class 1, Quality-Q1, heat-treated in accordance with ASTM C 1048, Kind FT, Condition A, double silvered with electro-deposited copper coating plus an organic protective coating, in accordance with ASTM C 1503, any Grade, Mirror Select Quality, Clear Color, 1/4-inch thickness.
 - 1. Silvered Mirror Glass of Quality-Q2, Kind HS, Mirror Glazing Quality, and/or other thicknesses may be used if it is the standard glazing type for manufactured units specified elsewhere.
- B. Manufactured units may be fabricated in accordance with product manufacturer's standard procedures.
- C. Unframed Mirrors: Edges finished and polished.
 - 1. Adhesive: Asphaltic bitumen
 - 2. Clips: Type 304 or 316 stainless steel
- D. Framed Mirrors: Fabricated of one-piece Type 304 stainless steel angle frame, 3/4 inch x 3/4 inch, with continuous integral stiffener on sides and beveled front to hold frame tightly against mirror. Corners shall be heliarc welded, ground and polished smooth. Exposed surfaces shall have satin finish with vertical grain. Glass edges shall be protected by plastic filler strips. Full-size, shock-absorbing, water-resisting, non-abrasive 1/8 inch thick polyethylene padding shall protect backs of mirrors. Mirrors shall be provided with 24 gage galvanized steel back with integral hanging brackets for mounting on concealed, rectangular wall hangers, and shall be secured with concealed Phillips head locking screws on bottom of frame.

2.06 ACCESSORIES

- A. Provide glazing accessories for specific applications of type recommended by glass manufacturer and glass fabricator and as required for complete, functional, weather tight installation.
- B. Cleaners and primers: Compatible with substrate, glazing materials, and project conditions.
- C. Setting blocks: Elastomeric material with Shore A durometer hardness between 80 and 90.
- D. Spacer shims: Elastomeric material blocks or extrusions with 50 to 60 Shore A durometer hardness.
- E. Edge blocks: Elastomeric material of hardness required to limit lateral movement of glass.

- F. Glazing tape: Preformed butyl compound, non-staining, non-migrating in contact with non-porous surfaces, coiled on release paper, black, and complying with ASTM C 1281 and AAMA 800.
- G. Glazing gaskets: Type, profile, and hardness required to maintain weathertight seal.
 - 1. Dense compression type: Molded or extruded material, black.
 - a. EPDM gasket complying with ASTM C 864.
 - b. Silicone complying with ASTM C 1115.
 - c. Thermoplastic polyolefin rubber complying with ASTM C 1115.
 - 2. Soft compression type: Molded or extruded, closed-cell, integral-skinned, black gasket complying with ASTM C 509, Type II.
- H. Sealants: Liquid applied, chemically curing type complying with ASTM C 920, compatible with materials and conditions, and capable of anticipated joint movement without weathertight seal failure.

PART 3 - EXECUTION

3.01 FACTORY GLAZED PRODUCTS

- A. Factory glaze the following products in accordance with product manufacturer's standard procedures:
 - 1. Casework
 - 2. Display cases and directories
 - 3. Fire extinguisher cabinets

3.02 FIELD GLAZED PRODUCTS

- A. Field glaze the following products as specified herein:
 - 1. Sidelites and borrowed lites
 - 2. Storefronts
 - 3. Sliding Glass Partitions

3.03 EXAMINATION

- A. Verify glass framing is accurately sized, structurally sound, square, and without bow.
- B. Inspect edges of glass. Do not install glass with edge damage.

3.04 PREPARATION

- A. Immediately prior to glazing, clean contact surfaces and ensure glazing channels and recesses are clean, free of obstructions, and ready to receive glazing.

- B. Prime surfaces as required for adhesion of sealants.

3.05 INSTALLATION

- A. Comply with GANA Glazing Manual and IGMA Glazing Guidelines, approved shop drawings, and manufacturer's instructions.
- B. Install setting blocks and spacers as recommended by referenced glazing standards and glass manufacturer. Set blocks in sealant.
- C. Provide edge blocking as required to prevent sideways movement of glass in glazing channel.
- D. Ensure glazing channels and stops provide required bite on glass, minimum edge and face clearances, and adequate sealant thickness.
- E. Tape glazing:
 1. Cut glazing tape to length and set continuously against permanent stops and projecting slightly above sightline.
 2. Tape joints: Butt joints; do not overlap tape. Seal joints with compatible sealant.
 3. Rest glass on setting blocks and push against tape for full contact at perimeter of lite.
 4. Remove tape release paper immediately prior to placing glass.
 5. Dry tape glazing: Install dense compressible gasket against glass and secure with removable glazing stop.
 6. Knife trim protruding edge of glazing tape.

3.06 UNFRAMED MIRROR INSTALLATION

- A. Coordinate with work of other Sections to ensure that surfaces to receive mirrors are not painted, coated, or otherwise treated in a manner detrimental to mirror adhesion.
- B. Ensure walls are rigid, plumb, smooth, clean, dry, and free of foreign materials.
- C. Apply one coat moisture-resistant paint to back of mirror and allow to completely dry.
- D. Set mirrors with mechanical fasteners and adhesive applied in accordance with manufacturer's instructions.
 1. Apply adhesive to mirror back with 25 percent coverage. Set mirror in place and hold firmly until adhesive sets.
 2. Support bottom of mirror with L-shaped bar mechanically fastened to wall blocking.
 3. Provide 2 clips minimum at top and each side of mirror. Mirrors greater than 6 square feet shall have 3 clips minimum at top.
- E. Place plumb and level without visible distortion.

3.07 CLEANING

- A. Clean glass immediately following installation. Remove sealants and other glazing materials from adjacent finished surfaces.
- B. Remove temporary labels after inspection.
- C. Clean all glass immediately prior to final walk-through.

END OF SECTION

SECTION 08 87 33

DECORATIVE FILMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Decorative Window Film.
- B. Related Requirements
 - 1. Section 08 80 00 - Glazing: General Glazing applications to receive architectural window film.

1.02 REFERENCES

- A. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals, 1997 Edition.
- B. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
- C. ASTM E 308 - Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System.
- D. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
- E. ASTM G 26 - Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight.

1.03 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Surface burning characteristics when tested in accordance ASTM E 84:
 - 1. Flame Spread: 25, maximum.
 - 2. Smoke Developed: 450, maximum.

1.04 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.

3. Installation methods.
- B. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
 - C. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
 1. Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.
 2. Provide a commercial building reference list of 5 (#) properties where the installer has applied window film. This list will include the following information:
 - a. Name of building.
 - b. The name and telephone number of a management contact.
 - c. Type of glass.
 - d. Type of film.
 - e. Amount of film installed.
 - f. Date of completion.
 3. Provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film manufacturer.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 3. Refinish mock-up area as required to produce acceptable work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.07 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: 3M Window Film, St. Paul, MN.
- B. Llumar/Vista, Solutia Inc., Martinsville, VA.
- C. Or equal in accordance with Division 01 for Substitutions.

2.02 SINGLE PATTERNED FILM

- A. 3M Fasara - SH2FGVG "VEGA" Decorative Film
 1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
 2. Visible Light Transmission (ASTM E 903, ASTM E308): 48 percent.
 3. Shading Coefficient at 90 Degrees (Normal Incidence) (ASTM E 903): 0.71.

PART 3 - PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant. Use new blade tips after 3 to 4 cuts.
- C. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
- D. Apply film to glass and lightly spray film with slip solution.
- E. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
- F. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
- G. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.

3.04 CLEANING AND PROTECTION

- A. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.

END OF SECTION

SECTION 08 91 00

METAL WALL LOUVERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Louvers and frames: Fixed Aluminum.
- B. Insect Screening.

1.02 REFERENCES

- A. AMCA 500 - (Air Movement and Control Association International) Test Method for Louvers, Dampers and Shutters.
- B. ASTM B 26 - Aluminum-Alloy Sand Castings
- C. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate
- D. ASTM B 221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes

1.03 SYSTEM PERFORMANCE

- A. Structural Performance: Provide louvers capable of withstanding effects of gravity loads and stresses within limits without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
- B. Seismic Performance: Provide louvers capable of withstanding effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 11, Seismic Criteria.
- C. Louver Performance (when a 4- by 4-foot louver is tested using AMCA Standard 500 and beginning of water penetration is 0.01-ozs-per-sq.ft free area)
 - 1. Air Volume Flow Rate: 6,300-cu-ft-per-min., at beginning point of water penetration
 - 2. Pressure Drop: less than 0.10-inch w.g. (intake or exhaust) at beginning point of water penetration
 - 3. Blade vibration or noise: unnoticeable
- D. Thermal Movements: Provide louvers that allow for thermal movements resulting from following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and

other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 degrees F ambient; 180 degrees F, material surfaces, Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.04 SUBMITTALS

- A. Shop drawings showing, layout, elevations, dimensions, and tolerances; head, jamb, and sill details; blade configuration; screening and frames.
- B. Product data on pre-assembled louvers describing design characteristics, maximum recommended air velocity, free area, materials and finishes.
- C. Manufacturer's installation instructions.
- D. Three samples illustrating blade configuration, gauge of metal and screening.

1.05 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacture of AMCA certified louvers with 5 years experience.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products of following manufacturers form basis for design and quality intended.
 1. Airolite Co., Mariette, OH.
 2. Construction Specialties, San Marcos, CA.
 3. All-Lite Louvers, Fort Worth, TX.
 4. Reliable, Inc., Geneva, AL.
 5. Ruskin Manufacturing, Kansas City, MO.
 6. Louvers and Dampers, Inc., Cincinnati, OH.
 7. Industrial Louvers, Inc., Delano, MN.
 8. American Warming and Ventilating, Inc., Holland, OH.
 9. Arrow United Industries, Wyalusing, PA.
- B. Or equal as approved in accordance with Division 01, General Requirements for Substitutions.

2.02 MATERIALS

- A. Basis of Design Product: Model CB609 (50% free area) Extruded Aluminum, Fixed, manufactured by Airolite Co.
 1. Louver Size: 4 inches deep.
 2. Louver Blade: Sloped at 45 degrees; minimum material thickness of 0.125 inch.

3. Louver Frame: Channel shape, mechanically fastened corner joints, material thickness of 0.125 inch.

B. Aluminum Louver Frame: Channel shape, mechanically fastened corner joints, material thickness of .125 inch.

C. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.

D. Aluminum Sheet: ASTM B 209, alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

E. Aluminum Castings: ASTM B 26, alloy 319.

F. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.

1. Use types and sizes to suit unit installation conditions.

2.03 ACCESSORIES

A. Insect Screen: 14 x 18, .011 aluminum mesh, set in aluminum frame, removable.

B. Flashings and Closures: Of same material as louver frame.

C. Sealants: As recommended by louver manufacturer.

2.04 FABRICATION

A. Head, Jamb, and Sill Flashings: Roll formed to required shape, one piece per location.

B. Screens: Install screen mesh in shaped frame with reinforced corner construction; screw to louver frame.

2.05 FINISHES

A. Prime and finish with Kynar 500 (PVDF) resin coating in color selected from manufacturer's standard color chart. Minimum 70% resin. AA-M12C42R1X, AAMA 2605.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that prepared openings and flashings are ready to receive Work and opening dimensions are as indicated on shop drawings.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Secure louvers in opening framing with concealed fasteners.
- D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- E. Install insect screening to interior of louver. Hinge screens for access.
- F. Install perimeter sealant and backing rod in accordance with Section 07 92 00.

3.03 CLEANING

- A. Clean surfaces and components.

END OF SECTION

SECTION 09 06 00
SCHEDULES FOR FINISHES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes partial list of project finishes.

1.02 PRODUCT OPTIONS

- A. Products identified in this Section represent the basis of design and quality required for this Project.
 - 1. To use an unnamed product, make a request for substitution following procedures in Division 01 requirements for substitutions.
 - 2. Products proposed as substitutions shall have at least 10 comparable installations that have been in place for 5 years, minimum, and remain in satisfactory condition.

1.03 SUBMITTALS

- A. Product Data: as specified in respective Section of this Manual. For proposed substitutions, accompany product data of proposed substitution with product data of specified material.
- B. Samples: as specified in respective Section of this Manual. For proposed substitutions, accompany sample of proposed substitution with sample of specified material.

PART 2 - PRODUCTS

- A. Not Used

PART 3 - EXECUTION

3.01 SCHEDULE OF CONCRETE FINISHES

A. 03 35 00 – Concrete Floor Finishing

1. **CONC1** :
 - a. Style: Smooth
 - b. Color: Natural
 - c. Finish: Clear Sealed

3.02 SCHEDULE OF MASONRY FINISHES

A. 04 22 00 – Reinforced Unit Masonry System

1. **MU1**:
 - a. Manufacturer: Angelus
 - b. Style: Stack Bond
 - c. Color: Warm Gray
 - d. Finish: Precision
 - e. Size: 8x8x16

3.03 SCHEDULE OF METAL FINISHES

A. 05 12 00 – Structural Steel

1. Architecturally Exposed Structural Steel:
 - a. Finish: Special Coating
 - b. Finish: **EP2**

B. 05 50 00 – Metal Fabrications

1. MTL 1 - Metal Wall Panels
 - a. 1/4 inch weathering steel panels
2. Corrugated Soffit
 - a. 18 gauge galvanized steel sheet, corrugated to match Architect's sample

3.04 SCHEDULE OF WOOD, PLASTIC AND COMPOSITE FINISHES

A. 06 40 00 – Architectural Woodwork

1. **PL1**:
 - a. Manufacturer: Wilsonart Laminate
 - b. Color: 7929K-78 Huntington Maple
2. **PL2**:
 - a. Manufacturer: Abet Laminati
 - b. Color: 411
 - c. Finish: SEI-Colorpact

3. **PL3:**
 - a. Manufacturer: Formica
 - b. Color: 5884-58 Chestnut Woodline
4. **PL4:**
 - a. Manufacturer: Abet Laminati
 - b. Color: 891
 - c. Finish: SEI
5. **SP1 - Solid Polymer:**
 - a. Manufacturer: Corian
 - b. Color: Glacier White
 - c. Finish/Texture: Matte
6. **QS1 – Quartz Surface:**
 - a. Manufacturer: Caesarstone
 - b. Color: Marrone 7250
 - c. Thickness: 3/4"
 - d. Location: Restroom
7. **WP1 – Wall Panel:**
 - a. Species: White Birch
 - b. Stain: **STN1**
 - c. Location: See Interior Elevations
8. **WDC1 – Ceiling Panel**
 - a. Species: White Birch
 - b. Stain: **STN1**
 - c. Note: 3/8" thick

3.05 SCHEDULE OF EXTERIOR FINISHES

- A. 07 46 46 – Exterior Fiber Cement Siding
 1. Manufacturer: James Hardie
 2. Style: Hardiplank - Smooth
 3. Color: To be selected by Architect from Manufacturer's full range
- B. 07 62 00 – Sheet Metal Flashing and Trim
 1. Prefinished; color to be selected by Architect from manufacturer's full range

3.06 SCHEDULE OF OPENING FINISHES

- A. 08 12 13 – Hollow Metal Frames
 1. Exterior Frames
 - a. Finish: Paint
 - b. Color: To be selected by Architect
 2. Interior Frames
 - a. Finish: Paint
 - b. Color: Paint to match adjacent color

B. 08 13 13 – Hollow Metal Doors

1. Exterior Door Face

- a. Finish: Paint
- b. Color: To be selected by Architect

2. Interior Door Face

- a. Finish: Paint
- b. Color: Paint to match adjacent color

C. 08 14 23 – Plastic Faced Wood Doors

1. Finish: **PL2**

D. 08 41 13 – Aluminum Entrances and Storefronts

- 1. Finish: Color Anodized
- 2. Color: Kawneer #18 Champagne

E. 08 80 00 – Glazing

1. **G1:**

- a. Manufacturer: PPG
- b. Color: Clear Float Glass

2. **G2:** Clear Tempered Glazing with Window Film

- a. Film Style: 3m Fasara
- b. Pattern: Vega
- c. Location: Laptop Desk – Covers All Glazing Area, Glass Wall Behind Circulation Desk: See Hatched Film Pattern Area On Window Schedule.

3. **G3:**

- a. Manufacturer: Skyline Design
- b. Style: Vitracolor
- c. Color: Standard White 2003-24
- d. Location: Circulation Desk

3.07 SCHEDULE OF GENERAL FINISHES

A. 09 24 00 – Portland Cement Plaster

1. **ES1** - Exterior Stucco:

- a. Finish: Integral color and elastomeric paint
- b. Color: Integral color finish coat to match scheduled paint color
- c. Texture: Fine sand float finish unless indicated otherwise
- d. Color: **EP1** unless indicated otherwise

B. 09 30 00 – Tiling

1. CT1:

- a. Manufacturer: Voguebay
- b. Style: Durastone Tile
- c. Color: Noce
- d. Finish: Matte
- e. Size: 12" x 12"
- f. Grout:
 - 1. Manufacturer: Laticrete
 - 2. Color: 56 Desert Khaki
 - 3. Size: 1/8"
- g. Location: Vestibule Floor

2. CT2:

- a. Manufacturer: Crossville
- b. Style: Color by Numbers
- c. Color: WT03 Three Hour Tour
- d. Finish: Satin
- e. Size: 4" x 12"
- f. Grout:
 - 1. Manufacturer: Laticrete
 - 2. Color: 56 Desert Khaki
 - 3. Size: 1/8"
- g. Location: Restroom Wall

C. 09 51 00 – Acoustical Ceilings – Lay-In

1. AC1:

- a. Panel:
 - 1. Manufacturer: Armstrong
 - 2. Style: Ultima Beveled Tegular
 - 3. Item number: 1912
 - 4. Color: Factory White
 - 5. Finish: Factory Finish
 - 6. Size: 24" x 24"

D. 09 53 23 – Acoustical Suspension Systems

1. AC1:

- 1. Manufacturer: Armstrong
- 2. Grid: 9/16" Suprafine
- 3. Color: Factory Finish White

E. 09 65 13 – Resilient Base

1. B1:

- a. Manufacturer: Roppe
- b. Color: 194 Burnt Umber
- c. Height: 4"
- d. Note: Cut from continuous rolls

F. 09 65 16 – Resilient Sheet Flooring – Non-Skid

1. **SV1:**
 - a. Manufacturer: Altro
 - b. Style: Walkway 20
 - c. Color: Buffalo VM20925
 - d. Altro Weldrod: 63
 - e. Altro Mastic 100: 239

G. 09 65 19 – Resilient Tile Flooring

1. **ETF1**
 - a. Manufacturer: Parterre Flooring Systems
 - b. Style: InGrained Resilient Plank
 - c. Color: 11505 Ebony Ipe
 - d. Size: 4" x 36"

H. 09 68 13 – Carpet Tile

1. **C1 – Carpet:**
 - a. Manufacturer: Shaw Contract Group
 - b. Style: 59463 Prisma Tile
 - c. Color: 63309 Café Highlights
 - d. Backing: EcoWorx Tile
 - e. Size: 24" x 24"

I. 09 72 16 – Custom Digital Wall Covering

1. **WC1:**
 - a. Manufacturer: MDC Wallcovering
 - b. Style: Digital Graphics
 - c. Design: Prepared by Architect
 - d. Location: Children's Stack
2. **WC2:**
 - a. Manufacturer: MDC Wallcovering
 - b. Style: Digital Graphics
 - c. Color: Provide by Architects
 - d. Location: Community Room

J. 09 72 17 – Fiberglass Reinforced Plastic Panels

1. **FRP1:**
 - a. Manufacturer: Marlite
 - b. Color: S100G White
 - c. Fire Rating: Class A
 - d. Location: Janitor's Room

K. 09 84 36 – Acoustical Ceiling Treatment

1. **AC2:**
 - a. Manufacturer: Tectum
 - b. Style: Bevel/Square
 - c. Thickness: 1"
 - d. Width: 4'
 - e. Length: 8'
 - f. Color: Paint color to be selected by Architect
 - g. Pattern: Ashlar

L. 09 90 00 – Painting

1. **P1: Field Paint**
 - a. Manufacturer: Frazee
 - b. Color: CLW 1013W Akamina
2. **P2: Accent Paint**
 - a. Manufacturer: Dunn-Edwards
 - b. Color: DE6277 Pebble Walk
3. **P3: Accent Paint**
 - a. Manufacturer: Dunn-Edwards
 - b. Color: DE6206 Desert Suede
4. **P4: Accent Paint**
 - a. Manufacturer: Dunn-Edwards
 - b. Color: DE5271 Ginger Spice
5. **P5: Accent Paint**
 - a. Manufacturer: Dunn-Edwards
 - b. Color: DE5486 Tropical Moss
6. **P6: Accent Paint**
 - a. Manufacturer: Dunn-Edwards
 - b. Color: DE5181 Georgia Clay
7. **P7: Accent Paint**
 - a. Manufacturer: Dunn-Edwards
 - b. Color: DE5487 Spring Marsh
8. **P8: Accent Paint**
 - a. Manufacturer: Dunn-Edwards
 - b. Color: DE5530 Military Green
9. **STN1: Wood Stain**
 - a. Color: Match PL 3
10. **EP1 - Exterior Paint Color 1: General field color**
 - a. Manufacturer: TBD
 - b. Color: TBD

- 11. **EP2** - Exterior Paint Color 2: Architecturally Exposed Structural Steel
 - a. Manufacturer: Dunn-Edwards
 - b. Color: DEC 756 Weathered Brown
- 12. **EP#** - Exterior Paint Color #:
 - a. Manufacturer: TBD
 - b. Color: TBD

3.08 SCHEDULE OF SPECIALTY FINISHES

A. 10 11 26 – Tackable Wall Panels

- 1. **TWP 1:**
 - a. Manufacturer: Maharam
 - b. Style: Tek-Wall 1001 397670
 - c. Color: 002 Milk
 - d. Fire Rating: Class 1/A ASTM E-84

B. 10 14 00 – Identification Signs (Room Identification Signs)

- 1. Tactile Plastic Signs
 - a. Font:
 - 1. Color: P4
 - b. Background:
 - 1. Color: P1

- 2. Non-Tactile Plastic Signs:
 - a. Font:
 - 1. Color: P4
 - b. Background:
 - 1. Color: P1

C. 10 14 23 – Restroom Signs

- 1. Tactile Plastic (wall mounted) Signs
 - a. Font:
 - 1. Color: P4
 - b. Background:
 - 1. Color: P1
- 2. Non-Tactile Plastic (door mounted) Signs
 - a. Font:
 - 1. Color: P4
 - b. Background:
 - 1. Color: P1

D. 10 14 54 – Exterior Signs

- 1. Individual Cast Letters
 - a. Finish: Clear Anodized
 - b. Style: Cast Metal Letters
 - c. Font: Heavy Ribbon 507
 - d. Size: 18" High, U.N.O.

E. 10 21 13 – Toilet Compartments

1. Toilet Compartments:
 - a. Manufacturer: Bobrick Partitions
 - b. Style: Sierra Series
 - c. Color: SC01 Golden Khaki

F. 10 22 39 – Folding Panel Partitions

1. Finish: **PL2**
2. Location: Sewing Room

G. 10 22 43 – Sliding Partition

1. **WD1**:
 - a. Species: White Birch
 - b. Stain: **STN1**

H. 10 44 13 – Fire Extinguishers and Cabinets

1. Fire Extinguisher Cabinet
 - a. Manufacturer: Potter-Roemer
 - b. Style: Alta
 - c. Material: Steel
 - d. Mounting: Recessed
 - e. Door Style: Solid Flush Panel
 - f. Cabinet Lettering: VAW – Vertical Ascending White

3.09 SCHEDULE OF EQUIPMENT FINISHES

A. 11 52 13 – Projection Screens

1. Projection Screen: Manually Operated
 - a. Manufacturer: DA-LITE
 - b. Style: Advantage Manual
 - c. Housing: Factory Finish, color to be selected by Architect from manufacturer's full range
 - d. Viewing Surface Finish: Matte White
 - e. Viewing Area Size: 60"(H) x 80"(W)

3.10 SCHEDULE OF FURNISHING FINISHES

A. 12 48 13 – Entrance Mats

1. **EM** - Entrance Mat:
 - a. Manufacturer: Construction Specialties Inc
 - b. Style: Pedigrid G1
 - c. Color: To be selected by Architect from manufacturer's full range
 - d. Size: As indicated

B. 12 24 13 – Roller Shades

1. **WT1:**

- a. Fabric: SheerShade Basketweave 90
- b. Color: Oyster/Beige SP13-90-3
- c. Openness: 3%

2. **WT2:**

- a. Fabric: Blackout Fabrics, Dual-Sided Premier X
- b. Color: Beige BX-4570-0
- c. Openness: 0%

C. 12 52 19 – Built-in Seating Units

Upholstery

Thickness: 4" high density foam w/Dacron wrap

Size: as noted in plan, details and sections

Edge: Square, no welting

Fabric:

- a. Manufacturer: Carnegie
- b. Style: Pullman 6242
- c. Color: 4
- d. Location: Children's Stack

END OF SECTION

SECTION 09 24 00

PORTLAND CEMENT PLASTERING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. Portland cement plasterwork on metal lath.

B. Related Requirements

1. Division 06 Section "Rough Carpentry" for wood framing and furring included in portland cement plastered assemblies.
2. Division 07 Section "Insulation" for thermal insulations and included in portland cement plaster assemblies.

1.02 REFERENCE STANDARDS

A. ASTM International

1. A 653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
2. C 91 - Masonry Cement
3. C 150 - Portland Cement
4. C 847 - Metal Lath
5. C 897 - Aggregate for Job-Mixed Portland Cement-Based Plasters
6. C 926 - Application of Portland Cement-Based Plaster
7. [C 932 - Surface-Applied Bonding Compounds for Exterior Plastering]
8. C 933 - Welded Wire Lath
9. C 954 - Steel Drill Screws
10. C 1002 - Steel Self-Piercing Tapping Screws
11. C 1063 - Installation of Lathing and Furring
12. C 1328 - Plastic (Stucco) Cement
13. E 84 - Surface Burning Characteristics of Building Materials
14. E 1677 - Air Retarder (AR) Material

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.

- C. Samples: For each type of finish coat indicated; 12 by 12 inches, prepared on rigid backing.
- D. Qualification Statements: Installer

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company that has successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Mock-ups: Before plastering, install mock-ups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mock-ups for each type of finish indicated.
 - 2. For interior plasterwork, simulate finished lighting conditions for review of mock-ups.
 - 3. Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. 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.

1.06 PROJECT CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork
 - 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
 - 2. Apply plaster when ambient temperature is greater than 40 deg F.
 - 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Lathing and plastering materials and accessories shall be marked by the manufacturer's designation to indicate compliance with the referenced standards.
- B. Where lath is attached to horizontal wood supports, either of the following attachments shall be used in addition to the methods of attachment described in referenced standards:
 - 1. Secure lath to alternate supports with ties consisting of a double strand of No. 18 W & M gage galvanized annealed wire at one edge of each sheet of lath. Wire ties shall be installed not less than 3 inches (76 mm) back from the edge of each sheet and shall be looped around stripping, or attached to an 8d common wire nail driven into each side of the joist 2 inches (51 mm) above the bottom of the joist or to each end of a 16d common wire nail driven horizontally through the joist 2 inches (51 mm) above the bottom of the joist and the ends of the wire secured together with three twists of the wire.
 - 2. Secure lath to each support with 1/2-inch-wide (12.7 mm), 1 1/2-inch-long (38 mm) No. 9 W & M gage, ring shank, hook staple placed around a 10d common nail laid flat under the surface of the lath not more than 3 inches (76 mm) from edge of each sheet. Such staples may be placed over ribs of 3/8-inch (9.5 mm) rib lath or over back wire of welded wire fabric or other approved lath, omitting the 10d nails.
- C. First and second coats of cement shall be applied and moist cured as set forth in ASTM C 926 and as follows:

| <u>Coat</u> | <u>Minimum Moist Curing Period</u> | <u>Minimum Interval Between Coats</u> |
|-------------|------------------------------------|---------------------------------------|
| First | 48 Hours | 48 Hours |
| Second | 48 Hours | 7 Days |

2.02 METAL LATH

- A. Diamond-Mesh Lath: ASTM C 847 with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating, Self-furring, 3.4 lb/sq. yd.
- B. Welded-Wire Lath: ASTM C 933; self-furring, 1.95 lb/sq. yd.
- C. Paper Backing: FS UU-B-790, Type I, Grade D, Style 2 vapor-permeable paper.
 - 1. Provide paper-backed lath unless otherwise indicated.

2.03 ACCESSORIES

- A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories

1. Foundation Weep Screenshot: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating.
2. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.
3. External-Corner Reinforcement: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.
4. Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
5. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
6. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
7. Two-Piece Expansion Joints: Fabricated from zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch wide; with perforated flanges.

2.04 MISCELLANEOUS MATERIALS

- A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in portland cement plaster.
- C. Bonding Compound: ASTM C 932.
- D. Steel Drill Screws: For metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of no fewer than three exposed threads.
- E. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.
- F. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter, unless otherwise indicated.
- G. Water-Resistive Barrier: ASTM E 1677, Type I air retarder; with minimum of 20 perms when tested according to ASTM E 96, Method A; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction. Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 1. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap
 2. Or equal, as approved in accordance with Division 01 requirements for Substitutions

- H. Self-Adhered Flashing: 40 mils, nominal, thickness composite sheet, fabricated with nominal min. 4-mil polyethylene film and 32-mil rubberized asphalt.
 - 1. Acceptable Products: as follows, or equal, approved in accordance with Division 01, General Requirements, for substitutions.
 - a. Perm-A-Barrier Wall Flashing by W.R. Grace Co., Cambridge, MA
 - b. Carlisle Coatings and Waterproofing CCW-705T-WF
 - c. Henry Company, Blueskin-SA
 - d. FortiFlash 40 Recessed Window Flashing by Fortifiber
 - 2. Furnish with prefabricated corner pieces, if available from sheet manufacturer. Provide manufacturer's edge and top sealant or mastic, and primers.
- I. Pre-Formed Penetration Flashings: Products of Quickflash Weatherproofing Products, Inc., Las Vegas, NV, or approved equal.

2.05 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II.
- B. Plastic Cement: ASTM C 1328.
- C. Sand Aggregate: ASTM C 897.
- D. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. El Rey Stucco Company, Inc., a brand of ParexLaHabra, Inc.; Premium Stucco Finish.
 - b. LaHabra, a brand of ParexLaHabra, Inc.; Exterior Stucco Color Coat.
 - c. Omega Products International, Inc.; ColorTek Exterior Stucco.
 - d. QUIKCRETE; QUIKCRETE Finish Coat Stucco, No. 1201.
 - e. SonoWall, BASF Wall Systems, Inc.; Thoro Stucco.
 - 2. Color: Standard or custom color(s) as scheduled.

2.06 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
 - 1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.

- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland and Plastic Cement Mixes
 - a. Scratch Coat: For cementitious material, mix 1 part plastic cement and 1 part portland cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - b. Brown Coat: For cementitious material, mix 1 part plastic cement and 1 part portland cement. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Lath and Plaster shall be applied over a solid substrate such as wood structural panels, exterior gypsum sheathing, or masonry or concrete surface.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare solid substrates for plaster that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.
- C. Water-Resistive Barrier. Cover surface scheduled for plaster with water-resistive barrier sheet. Secure with mechanical fasteners, using suitable washers. Tape seams and laps as recommended by sheeting manufacturer. Coordinate with installation of flashing at openings and penetrations.
- D. Install window/door self-adhered flashings after installation of water-resistive barrier, as follows:
 - 1. Make a modified "I-cut" in the water-resistive barrier.
 - 2. Cut a flap above the rough opening to allow head flashing installation.
 - 3. Fold side and bottom flaps into rough opening and secure. Flip head flap up and temporarily secure.

4. Apply flexible flashing at sill; width of flashing shall be full depth of rough opening plus 4-inches minimum and length shall be at least 12-inches longer than width of opening.
 - a. Sill flashing not required for doors at first floor slab-on-grade construction.
 5. Install pre-formed sheet metal or plastic sill pan in full bed of mastic.
 - a. For doors at first floor slab-on-grade construction, pre-formed sheet metal or plastic corner pans may be installed at both sides in lieu of full sill pan.
 6. For face-flange type window/door assemblies, install with full bed of mastic prior to remaining flashings.
 7. Install flexible flashing at sides of opening; extend 6-inches minimum above top of rough opening to below bottom of sill flashings and pans.
 - a. For face-flange type assemblies, install 4-inch wide flashing covering flanges.
 - b. For other openings, width of flashing shall be full depth of rough opening plus 4-inches minimum.
 8. Install flexible flashing at top of opening; extend beyond outside edges of both jamb flashings.
 - a. For face-flange type assemblies, install 4-inch wide flashing covering flanges.
 - b. For other openings, width of flashing shall be full depth of rough opening plus 4-inches minimum.
 - c. Flip head flap down over the head flashing and secure with sealing tape.
 9. Metal Door/Window Head Drip: required at all openings not protected by overhangs and other openings as indicated in the Drawings.
 - a. For face-flange type assemblies, install metal drip after installation of jamb flashings and before head flashing, over the flange.
 - b. For other openings, install drip after installation of the head flashing and before turning down flap of water-resistive barrier (water-resistive barrier laps over metal drip).
- E. Install pre-formed penetration flashings.

3.03 INSTALLATION, GENERAL

- A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.
- B. Provide 3-coat plaster work over metal lath at all framed wall assemblies.
- C. [At masonry and concrete walls, provide 2-coat plaster work unless greater thickness is required to bring finished surface flush with adjacent 3-coat work or other finishes.]

3.04 INSTALLING METAL LATH

- A. General: Install according to ASTM C 1063.

- B. Partition Framing and Vertical Furring: Install self-furring, paper-backed, welded-wire lath.
- C. Ceiling and Horizontal Framing: Install self-furring, paper-backed, diamond-mesh lath.
- D. Install paper-backed lath lapped backing-on-backing and lath-on-lath; lap backing not less than 1 inch.

3.05 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Reinforcement for External Corners
 - 1. Install lath-type, external-corner reinforcement at exterior locations.
- C. Control Joints: Install control joints at locations indicated on Drawings, and as follows:
 - 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes
 - a. Vertical Surfaces: 144 sq. ft.
 - b. Horizontal and other Non-vertical Surfaces: 100 sq. ft.
 - 2. At distances between control joints of not greater than 16 feet o.c.
 - 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
 - 4. Where control joints occur in surface of construction directly behind plaster.
 - 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.06 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
 - 1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
 - 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 - 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Walls; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 3/4-inch thickness.
 - 1. Portland and plastic cement mixes.
- C. Ceilings; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 1/2 inch thick.
 - 1. Portland and plastic cement mixes.

- D. Plaster Finish Coats: Apply to provide scheduled finish in accordance with.

3.07 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.08 PAINTING

- A. Paint with elastomeric coating as specified in Section 09 90 00 unless indicated otherwise.

3.09 PROTECTION

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Gypsum Board Panels.
- B. Taped and sanded joint treatment.
- C. Water-resistant backer board for tile application.
- D. Glass Mat Water-Resistant Backing Board for ceramic tile application.
- E. Related Sections
 - 1. Section 06 10 00 - Rough Carpentry.
 - 2. Section 09 30 00 - Tiling.
 - 3. Section 09 90 00 - Painting

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C475 - Joint Compound and Joint Tape for Finishing Gypsum Board.
 - 2. ASTM C645 - Specification for Nonstructural Steel Framing Members.
 - 3. ASTM C754 - Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 4. ASTM C840 - Application and Finishing of Gypsum Board.
 - 5. ASTM C954 - Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in. in thickness.
 - 6. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
 - 7. ASTM C1177 - Glass Mat Gypsum Substrate for Use as Sheathing.
 - 8. ASTM C1178 - Glass Mat Water-Resistant Gypsum Backing Panel.
 - 9. ASTM C1396 - Specification for Gypsum Board.
- B. Underwriters Laboratories, Inc. (UL)
 - 1. UL Directory - Fire Resistance Directory, Volume 1, Latest Edition.
- C. Gypsum Association (GA)
 - 1. GA-201 - Gypsum Board for Walls and Ceilings
 - 2. GA-214 - Levels of Gypsum Board Finish
 - 3. GA-216 - Application and Finishing of Gypsum Board
 - 4. GA-600 - Fire Resistance Design Manual
 - 5. GA-226 - Gypsum Board installation on Curved Walls.

- D. 2010 California Building Code (CBC)
 - 1. CBC-7 - Chapter 7, Fire Resistant Materials and Construction
 - 2. CBC-25 - Chapter 25, Gypsum Board and Plaster

1.03 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 following products:
 - 1. Trim Accessories: Full-size sample in 12-inch- long length for each trim accessory indicated.
 - 2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.04 QUALITY ASSURANCE

- A. Applicator: Company specializing in gypsum board systems work with three years experience.

1.05 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.
- C. Steel Framing and related accessories shall be stored and handled in accordance with AISI Code of Standard Practice.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products of following manufacturers form basis for design and quality intended.
 - 1. United States Gypsum Corporation (USG), Chicago, IL.
 - 2. Georgia-Pacific, Atlanta, GA.
 - 3. National Gypsum Co./Gold Bond Building Products, Charlotte, NC.

4. CertainTeed Corporation, Valley Forge, PA.

B. Or equal as approved in accordance with Division 01, General Requirements for Substitutions.

2.02 BOARD MATERIALS

A. Regular Gypsum Board: ASTM C1396; 5/8 inch thick, maximum permissible length; ends square cut, tapered round edges.

B. Fire-rated Gypsum Board: ASTM C1396; Type X, fire resistive type, UL Listed; 5/8 inch thick, maximum permissible length; ends square cut, tapered round edges.

C. Moisture Resistant Type X Gypsum Board: ASTM C1396; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.

D. Exterior Gypsum Sheathing Board, backside of Parapet Walls: ASTM C1177; moisture resistant, and fire resistant, Type X, 5/8 inch thick, maximum permissible length, ends square cut, inorganic glass fiber mat faced, 48 inch width, DensGlass Exterior sheathing by Georgia Pacific, USG Securock Glass-Mat, Gold Bond e²XP by National Gypsum, GlasRoc Brand Sheathing by BPB America or equal.

E. Very Hi-Impact Wallboard: Reinforced fiber mesh for increased indentation and penetration resistance ASTM C1396, ASTM C1278, Type X, 5/8 inch thick, tapered edges, ends cut square.

1. Fiberock Panels: USG VHI Abuse-Resistant, 5/8 inch thick.

2. Fire Shield Type X. Fiberock 5/8 inch thick, USG VHI.

3. Gold Bond Hi-Impact XP Wallboard: 5/8 inch thick, with fiberglass mesh embedded core, National Gypsum Co.

F. High Performance (Glass Mat) Water-Resistant Tile Backing Board: ASTM C1178, ASTM D3273, 5/8 inch thick Fireguard Type X, and 1/2 inch thick for non-rated walls. Glass mats on front and back, applied acrylic coating on front side, Dens-Shield Tile Backer by Georgia-Pacific, Atlanta GA, USG Fiberock Aqua Tough Exterior Sheathing or equal.

2.03 MATERIALS

A. Taping, Bedding and Finishing Compound: ASTM C475; compatible with tape and substrate.

1. USG SHEETROCK Brand Taping Joint Compound Ready-Mixed, drying-type, non-asbestos, vinyl base.

2. USG SHEETROCK Brand Topping Joint Compound Ready-Mixed, drying-type non-asbestos, vinyl base.

3. USG SHEETROCK Powder Joint Compound, drying-type, non-asbestos vinyl base, conventionally drying. For Taping and Topping.

4. USG SHEETROCK Powder Setting-type Joint Compound, chemical hardening.

5. Contractor's Option: USG SHEETROCK Lightweight All Purpose Joint Compound (Plus 3) with Dust Control.

6. USG SHEETROCK Brand All Purpose Joint Compound Ready-Mixed for laminating gypsum panels in multilayer partitions.
 7. USG SHEETROCK Brand Joint Tape-Heavy, ASTM C475, high strength cross-fibered paper tape.
 8. Drywall Primers: USG First Coat.
 9. Or equal as approved in accordance with Division 01, General Requirements for substitutions.
- B. Accessories: Corrosive Protective-Coated steel.
1. U-Trims: USG, Dietrich No. 200-A for joint compound or equal.
 2. J-Trim Casings, reveal type: USG, Dietrich No. 401 for 1/2" panels, 402 for 5/8" panels, no finishing compound.
 3. Control Joint: Dietrich 093, USG Control Joint No. 093, Zinc metal.
 4. Corner Bead: USG, Dietrich No. 103 for joint compounds or equal. [Dietrich MiniBead, USG, No. 800 or 900 for veneer plaster applications].
- C. Fasteners: Self-drilling tapping screws shall comply ASTM C 954; Self piercing screws shall comply ASTM C 1002;
1. ASTM C1002, No. 2 Phillips recessed, bugle head, power-driven. Nails not permitted.
 2. Type S-12, ASTM C954, 16 gage steel studs, minimum penetration 3/8 inch.
 3. Type S, ASTM C 1002, 20 gage steel studs, minimum penetration 3/8 inch.
 4. Type G, gypsum board to gypsum board, minimum penetration 1/2 inch.
 5. Type W, wood construction, minimum penetration 5/8 inch.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that site conditions are ready to receive Work.
- B. Beginning installation means acceptance of substrate.

3.02 PREPARATION

- A. Delivery and Storage: Arrange for an adequate supply of materials on the jobsite so that progress of Work will be uninterrupted. Materials and accessories shall be delivered in original containers and bundles, and identified with the manufacturer's name and brand. Store gypsum board on flat, solid supports in dry areas, well protected from the elements.
- B. Provide fixtures, anchors, sleeves, inserts and miscellaneous items, and provide openings and chases as necessary. Prior to closing in and finishing of dry wall Work, ascertain that piping, conduit, ductwork and fixtures which are to be concealed and which penetrate gypsum boards are in place, tested and approved.
- C. Scaffolding: Construct, erect and maintain in conformance with applicable laws and ordinances.

- D. Protection, Patching and Cleaning: Adjacent surfaces of other materials shall be protected from damage. Dry wall surfaces that have been cut out shall be neatly patched. Damaged or defective gypsum board finish shall be replaced. During progress of Work, rubbish droppings and water materials shall be removed.
- E. Fire Protection: Where required, the Work shall comply with the requirements for the protection rating indicated in the governing building code.
- F. Fire Sprinkler System: In areas where sprinkler heads occur, exercise care when installing drywall work. Do not damage or obstruct the heads in any way.

3.03 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with ASTM C840, GA 201, GA 216 and Section 2508 California Building Code. Use board types as indicated; if not indicated use board types as follows.
 - 1. Use Type X (fire-rated core) drywall unless indicated otherwise.
 - 2. Where gypsum wallboard is indicated as base for ceramic tile use board types as follows
 - a. Use Type WR (moisture resistant / green) board, except as follows
 - b. At walls to which plumbing fixtures are mounted and portions of adjoining walls within 2'-0" of a plumbing fixture, install fiberglass-mat faced tile backer board to 4'-0" above the finished floor with Type WR, above, moisture and mold resistant gypsum board.
- B. Non-rated: Erect single layer gypsum board parallel or perpendicular on vertical framing, attached to studs and framing members with the specified fasteners spaced at 16" on center with screws and at top and bottom, 12" on center with screws at ceilings. Solid backing not required at joints running perpendicular to studs and framing members for walls.
 - 1. For walls requiring STC 50 or higher, install extra layer of 1/2" gypsum board on one side, unless noted otherwise on wall schedule.
- C. Rated: Erect single fire-rated gypsum board panels in accordance with Table 705.4, Note a, and Section 708 California Building Code, and GA-600, for one-hour or two hour, fire-rated, non-bearing Fire Walls or Fire Partitions, steel or wood stud construction.
 - 1. Gypsum board panels installed parallel to vertical studs or framing shall be spaced at 8" on center with screws at vertical edges, and 12" on center with screws in field and at top and bottom, and 12" on center with screws at ceilings. Solid backing not required at joints running perpendicular to studs and framing members for walls. Stagger vertical joints 24 inches on centers each side and opposite sides. Where joints are not staggered required minimum 24 inches, solid backing shall be provided. All joints shall be treated except as provided herein.
 - 2. For walls requiring STC 50 or higher, install extra layer of 1/2" gypsum board on one side, unless noted otherwise on wall schedule.

- D. Place control joints consistent with lines of building spaces as indicated or at maximum of 30 ft on centers. At rated walls, provide with fire rated panels same as wall construction.
- E. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
- F. Seal all cutout and penetrations: For electrical, mechanical, plumbing and structural framing cutouts and penetration at interior surfaces. Per Section 07 92 00 for non-rated wall, and fire-rated sealant for rated walls per section 07 84 00.

3.04 JOINT TREATMENT

- A. Exposed gypsum board in wall areas and ceiling areas shall have joint compound and be taped and sanded per requirements of GA-114 for levels specified and ready for paint.
- B. On installations where two layers of gypsum board are required, only the face layer will require finishing of joints and screwheads.
- C. Gypsum wallboard joints in walls may either be exposed or covered with joint tape and joint compound for the portion of the wall above a suspended ceiling, which is part of a fire resistive floor-ceiling or roof-ceiling assembly, as listed in U.L. Fire Resistive Ratings (BXUV), when the following conditions are met:
 - 1. Vertical joints occur over framing members.
 - 2. Horizontal joints are staggered 24 inches on opposite sides or covered with 6 inch wide strips of gypsum board attached with 1-1/2 inch laminating screws at 8 inches on centers.
 - 3. Partition is two-ply system with joints staggered 16 inches or 24 inches.
 - 4. Partition is not part of a smoke or sound control system.
- D. Fire-Rated Partitions: Perimeters of fire-rated partitions shall be caulked with fire-rated sealant as specified in Section 07 84 00, both sides of partition.
- E. Sound-Rated Partitions: Perimeters and penetrations of sound-rated partitions shall be caulked with acoustical sealant as specified in Section 07 92 00, both sides of partition.
- F. Moisture-resistant gypsum board shall have joint compound and taped and sanded. Edges of moisture resistant gypsum board that expose gypsum core shall be job taped before the board is installed.
- G. Joints, except where excluded above including internal corners, shall be filled and taped. Thin uniform layer of joint compound, approximately 3 inches wide, shall be applied over joint. Tape shall be set in joint compound and finish levels required below. Internal angles, both horizontal and vertical, shall be reinforced and with tape folded to form straight and true angle. Metal external corners shall be set in place. Joints shall be allowed to dry at least 24 hours between each application of cement.

- H. Gypsum board finish shall be to the following levels as defined by GA-214:
1. Plenum areas above ceilings - Level 1.
 2. Substrate for tile, tackable wall panels, tackboards and markerboards - Level 2.
 3. Areas receiving heavy textured paint - Level 3.
 4. Areas receiving vinyl wall covering, texture finish or light textured flat paint - Level 4.
 5. All Areas receiving non-textured, flat, egg-shell, gloss or semi-gloss paint - Level 5.
Backroll application of sealer. Level 5 requires one of the following.
 - a. Skim coat: A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to entire surfaces. Surfaces shall be smooth and free of tool marks and ridges.
 - b. Acrylic latex-based coating, spray apply: USG SHEETROCK Brand Primer-Surfacer Tuf-Hide or ProForm Surfacer/Primer by National Gypsum or equal. Apply to 15-20 mils wet film thickness to entire surface.
 - c. Prep Coat Plus by Hamilton Materials Inc, Orange, CA.
 - d. Additionally apply primer coat per Section 09 90 00 Painting.

3.05 INSTALLATION OF HIGH PERFORMANCE TILE BACKER

- A. Install panels to framing. Precut board to required sizes and make all cutouts. Butt ends and edges. Cut board to fit by scoring and breaking or by sawing from face side. Install Board horizontally or vertically at non-rated walls, vertically at rated walls as required by UL Design.
- B. Secure to light gauge steel with 1 inch -1-5/8 inch waferhead or buglehead, multilevel thread, sharp point drywall screw (Type S Hi-Lo) and to heavy gauge steel with 1 inch -1-5/8 inch waferhead or buglehead, fine thread, drill point drywall screw (Type S-12). For Wood framing: ASTM C1002, No. 2 Phillips recessed, bugle head, power-driven, Type W, minimum penetration 5/8 inch. Space fasteners 6 inches on centers for walls and ceilings.
- C. For joints and angles in tile areas: Apply 2 inches glass fiber tape over joints. Embed tape in adhesive used to set tile. Allow joints to dry prior to setting tile. Caulk openings with flexible sealant prior to installation of tile.

3.06 REPAIR OF GYPSUM BOARD SURFACES

- A. Before any work is started, cover all floors completely with canvas and protect all surfaces.
- B. Ceilings: Air blow, broom, rag and dust all surfaces to remove as much dust and dirt as possible. Hand scrape and machine wire tool to remove all loose and peeling paint to a tight edge.
- C. Interior Walls: Repair all walls after ceilings are completed.

- D. Remove contamination from surfaces. Repair and match new panels to align and to match adjacent surfaces. Feather edges into the existing adjacent surface. Repair cracks, holes, gouges and damaged spots larger than 1/2", tape joints and finish per this section. Paint per Section 09 90 00.
- E. Plaster Surfaces: Fill hairline cracks, small holes and imperfections with patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

3.07 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Ceramic Tile
 - 2. Thin-Set Tiling
- B. Related Requirements
 - 1. Division 09 Section "Schedules for Finishes" for color, texture, and pattern of field tile and trim shapes, size of field tile, trim shapes, and color of grout
 - 2. Division 09 Section "Gypsum Board" for thin-set tile substrates

1.02 REFERENCE STANDARDS

- A. ANSI – American National Standards Institute
 - 1. A108 – Installation of Ceramic Tile
 - 2. A108.01 – General Requirements: Subsurfaces and Preparations by Other Trades
 - 3. A108.02 – General Requirements: Materials, Environmental, and Workmanship
 - 4. A108.1A – Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar
 - 5. A108.1B – Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
 - 6. A108.5 – Installation of Ceramic Tile with Dry-Set or Latex-Portland Cement Mortar
 - 7. A108.6 – Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy
 - 8. A108.10 – Installation of Grout in Tilework
 - 9. A108.13 – Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone
 - 10. A118.3 – Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive
 - 11. A118.4 – Latex-Portland Cement Mortar
 - 12. A118.6 – Standard Cement Grouts for Tile Installation
 - 13. A118.7 – Polymer Modified Cement Grouts for Tile Installation
 - 14. A118.10 – Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation
 - 15. A118.12 – Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation

16. A137.1 – Mosaic, Quarry, Pressed Floor, Glazed Wall, Porcelain, and Specialty Tiles Including Trim Shapes

B. ASME – American Society of Mechanical Engineers

1. A112.6.3 – Floor and Trench Drains

C. ASTM International

1. A 82 – Steel Wire, Plain, for Concrete Reinforcement
2. A 185 – Steel Welded Wire Reinforcement, Plain, for Concrete
3. A 666 – Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
4. C 109 – Compressive Strength of Hydraulic Cement Mortars
5. C 373 – Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products
6. C 627 – Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
7. C 794 – Adhesion-in-Peel of Elastomeric Joint Sealants
8. C 847 – Metal Lath
9. C 905 – Density of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
10. C 1027 – Abrasion Resistance of Glazed Ceramic Tile
11. C 1028 – Static Coefficient of Friction
12. C 1353 – Abrasion Resistance of Dimension Stone Subjected to Foot Traffic
13. D 751 – Coated Fabrics
14. D 4068 – Chlorinated Polyethylene (CPE) Sheeting
15. D 4716 – (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
16. E 84 – Surface Burning Characteristics of Building Materials
17. F 1869 – Moisture Vapor Emission Rate of Concrete Subfloor

D. ISO – International Organization for Standardization

1. 9001 – Quality management systems -- Requirements

E. TCNA – Tile Council of North America

1. TCA Handbook for Ceramic Tile Installation

1.03 PREINSTALLATION MEETINGS

A. At least three weeks prior to commencing the work, hold a meeting at the jobsite to discuss conformance with requirements of specification and job site conditions. Representatives of Owner, Architect, Contractor, tile subcontractor, tile manufacturer, installation system manufacturer, and any other parties who are involved in the scope of this installation shall attend the meeting.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated

- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
 - 1. Dimension and draw detail drawings at a minimum scale of 1/4 inch = 1 foot. Include drawings of pattern at inside corners, outside corners, termination points and location of all equipment items such as thermostats, switch plates, mirrors and toilet accessories mounted on surface. Submit drawings showing ceramic tile pattern elevations and floor plans.
- C. Samples
 - 1. Full-size units of each type and composition of tile and for each color and finish required
 - a. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required
 - a. Make samples at least 12 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
 - 3. Full-size units of each type of trim and accessory
 - 4. Stone or composite thresholds in 6-inch lengths
 - 5. Metal edge strips in 6-inch lengths
- D. Test and Evaluation Reports: For each tile-setting and -grouting product
- E. Manufacturers' Instructions: Installation system manufacturer's installation instructions
- F. Qualification Statements: Installation system manufacturer and installer
- G. Closeout Submittals
 - 1. Operation and Maintenance Data: Special requirements, if any, for cleaning and maintenance
 - 2. Warranty Documentation

1.05 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.06 QUALITY ASSURANCE

A. Qualifications

1. Installation System Manufacturer: Company specializing in adhesives, mortars, grouts and other installation materials with ten (10) years minimum experience and ISO 9001 certification. Obtain installation materials from single source manufacturer to insure consistent quality and full compatibility.
2. Installer: Company specializing in installation of ceramic tile, mosaics, pavers, trim units and thresholds with five (5) years documented experience, having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Mock-ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mock-up of each type of floor tile installation.
2. Build mock-up of each type of wall tile installation.
3. Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.08 FIELD CONDITIONS

A. Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

- B. Do not perform tiling unless the substrate and ambient temperature is at least 50 degrees F (10 degrees C) and rising. Maintain temperature above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) while the work is being performed and for at least 7 days after completion of the work. When temporary heaters are used, ventilate the area to the outside to avoid carbon dioxide damage to new tiling.

1.09 WARRANTY

- A. The manufacturer of adhesives, mortars, grouts and other installation materials shall provide a written twenty five (25) year warranty, which covers materials and labor.

PART 2 - PRODUCTS

2.01 TILE, GENERAL

- A. Provide colors, textures, and patterns of field tile and trim shapes, sizes of field tile, and trim shapes as scheduled in Section 09 06 00 and as indicated on the Drawings.
- B. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- C. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 - 1. Where tile is indicated for installation on exteriors or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- D. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.
- E. For wall tile in wet areas, as defined in the TCA Handbook, and all floor tile, provide a 0.50 maximum percent water absorption in accordance with ASTM C 373.
- F. For floor tile, provide a minimum coefficient of friction of 0.60 wet and dry in accordance with ASTM C 1028, except as follows:
 - 1. Not less than 0.7 (wet condition) for bathing areas.
 - 2. Not less than 0.8 on ramps for wet and dry conditions.
- G. Identify floor tile as Class IV, 6000 revolutions, unless indicated otherwise, durability classification as rated by the manufacturer when tested in accordance with ASTM C 1027 for abrasion resistance as related to foot traffic.

2.02 CERAMIC TILE

- A. Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. Composition: Vitreous or impervious natural clay or porcelain, as indicated.

2.03 THIN-SET TILE SETTING MATERIALS

- A. Waterproofing Membrane, ANSI A118.10, to be thin, cold applied, single component liquid and load bearing. Reinforcing fabric to be non-woven rot-proof specifically intended for waterproofing membrane. Waterproofing Membrane to be non-toxic, non-flammable, and non-hazardous during storage, mixing, application and when cured. It shall be certified by IAPMO and ICC approved as a shower pan liner and shall also meet the following physical requirements:
 - 1. Hydrostatic Test (ASTM D 4068): Pass
 - 2. Elongation @ break (ASTM D 751): 20-30%
 - 3. System Crack Resistance (ANSI A118.12): Pass (High)
 - 4. 7 day Tensile Strength (ANSI A 118.10): >265 psi (1.8 MPa)
 - 5. 7 day Shear Bond Strength (ANSI A118.10): >200 psi (1.4 MPa)
 - 6. 28 Day Shear Bond Strength (ANSI A118.4): >214 psi (1.48 – 2.4 MPa)
 - 7. Service Rating (ASTM C 627): Extra Heavy
 - 8. Total VOC Content: < 0.05 mg/m³
- B. Crack Suppression Membrane, ANSI to be thin, cold applied, single component liquid and load bearing. Reinforcing fabric (if required or used) to be non-woven, rot-proof specifically intended for crack suppression membrane. Materials to be non-toxic, non-flammable, and non-hazardous during storage, mixing, application and when cured. Crack Suppression Membrane shall also meet the following physical requirements:
 - 1. Elongation @ break (ASTM D751): 20-30%
 - 2. System Crack Resistance (ANSI A118.12): Pass (High)
 - 3. 7 day Tensile Strength (ANSI A118.10): 265 – 300 psi (1.8 – 2.0 MPa)
 - 4. 7 day Shear Bond Strength (ANSI A118.10): 200 – 275 psi (1.4 – 1.9 MPa)
 - 5. 28 Day Shear Bond Strength (ANSI A118.4): >214 – 343 psi (1.48 – 2.4 MPa)
 - 6. Service Rating (TCA/ASTM C627): Extra Heavy
 - 7. Total VOC Content: < 0.05 mg/m³
- C. Latex Portland Cement Thin Bed Mortar for thin set and slurry bond coats to be weather, frost, shock resistant, non-flammable and meet the following physical requirements:
 - 1. Compressive strength (ANSI A118.4): >2500 psi (17.2 MPa)
 - 2. Bond strength (ANSI A118.4): >450 psi (3.1 MPa)
 - 3. Smoke & Flame Contribution (ASTM E84 Modified): 0
 - 4. Total VOC Content: < 0.05 mg/m³

2.04 TILE GROUTING MATERIALS

- A. Epoxy Grout (Commercial/Residential) shall be non-toxic, non-flammable, non-hazardous during storage, mixing, application and when cured and shall meet the following physical requirements:

1. Compressive Strength (ANSI A118.3): 3500 psi (24 MPa)
2. Shear Bond Strength (ANSI A118.3): 1000 psi (6.9 MPa)
3. Tensile Strength (ANSI A118.3): 1100 psi (7.6 MPa)
4. Thermal Shock (ANSI A118.3): >500 psi (3.5 MPa)
5. Water Absorption (ANSI A118.3): < 0.5 %
6. Vertical Joint Sag (ANSI A118.3): Pass
7. Total VOC Content: < 0.05 mg/m³
8. Cured Epoxy Grout to be chemically and stain resistant to ketchup, mustard, tea, coffee, milk, soda, beer, wine, bleach (5% solution), ammonia, juices, vegetable oil, brine, sugar, cosmetics, and blood, as well as chemically resistant to dilute acids and dilute alkalis.

2.05 ACCESSORIES AND MISCELLANEOUS MATERIALS

- A. Expansion and Control Joint Sealant to be a one component, neutral cure, exterior grade silicone sealant and meet the following requirements:

1. Tensile Strength (ASTM C794): 280 psi (1.9 MPa)
2. Hardness (ASTM D751; Shore A): 25 (colored) / 15 (clear)
3. Weather Resistance (QUV Weather-ometer): 10000 hours (no change)

- B. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Grout release in form of manufacturer's standard liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

- D. Moisture Vapor Reduction to be epoxy based and GreenGuard compliant as well as meet the following physical requirements:

1. Shear Bond to Concrete (ANSI A118.12-5.1.5): >285 psi (2.0 MPa)
2. Alkalinity Resistance (ASTM C267): Pass
3. Permeability (ASTM F1869): 9.7 lbs/1,000ft²/24 hours down to 0.2 lbs/1,000 ft²/24hours (248 µg/s•m² down to 11 µg/s•m²)

- E. Self-Leveling Underlayment shall be mixed with water to produce a pumpable, fast setting, free flowing cementitious underlayment which can be poured from a feather-edge to 1 ½" (38mm) thick in one pour.
 - 1. 4 Hour Compressive Strength (ANSI A118.4 Mod.): >1500 psi (10.3 MPa)
 - 2. 1 Day Compressive Strength (ANSI A118.4 Mod.): >2800 psi (19.3 MPa)
 - 3. 28 Day Compressive Strength (ANSI A118.4 Mod.): >4300 psi (29.7 MPa)
 - 4. Tensile Strength (ANSI A118.7): >500 psi (3.5 MPa)
 - 5. Time To Foot Traffic: 3 – 4 Hours
 - 6. Total VOC Content: < 0.05 mg/m³
- F. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; white zinc alloy, nickel silver, or stainless-steel, ASTM A 666, 300 Series exposed-edge material as scheduled.
- G. For Colors, Refer to Section 09 06 00, Schedule for Finishes.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.03 TILE INSTALLATION - GENERAL

- A. Comply with setting and grouting material manufacturer's requirements and applicable parts of ANSI A108.
 - 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas.
 - c. Tile floors composed of tiles 8 by 8 inches or larger.
 - d. Tile floors composed of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
1. Ceramic Mosaic Tile: 1/16 inch.
 2. Quarry Tile: 3/8 inch.
 3. Paver Tile: 3/8 inch.
 4. Glazed Wall Tile: 1/16 inch.
 5. Decorative Thin Wall Tile: 1/16 inch.
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Stone and Composite Thresholds: Install thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
- I. Metal Edge Strips: Install at locations indicated.

3.04 THIN-SET TILING

A. Floors

- 1) Install latex portland cement thin bed mortar in compliance with current revisions of ANSI A108.02 (3.11) and ANSI A108.5. Use the appropriate trowel notch size to ensure proper bedding of the tile, brick or stone selected. Work the latex portland cement thin bed mortar into good contact with the substrate and comb with notched side of trowel. Spread only as much latex portland cement thin bed mortar as can be covered while the mortar surface is still wet and tacky. When installing large format (>8" x 8") tile/stone, rib/button/lug back tiles, pavers or sheet mounted ceramics/mosaics, spread latex portland cement thin bed mortar onto the back of (i.e. 'back-butter') each piece/sheet in addition to trowelling latex portland cement thin bed mortar over the substrate. Beat each piece/sheet into the latex portland cement thin bed mortar with a beating block or rubber mallet to insure full bedding and flatness. Allow installation to set until firm. Clean excess latex portland cement thin bed mortar from tile or stone face and joints between pieces.

- 2) Chemical Resistant, Water Cleanable Tile-Grouting Epoxy (ANSI A118.3): Follow manufacturer's recommendations for minimum cure time prior to grouting. Store liquid components for 24 hours @ 70-80°F prior to use to facilitate mixing and application. Substrate temperature must be 40-95°F. Verify joints are free of dirt, debris or grout spacers. Sponge or wipe dust/dirt off tile faces and remove water standing in joints. Apply grout release to face of absorptive, abrasive, non-slip or rough textured ceramic tile, pavers, bricks, stone or trim units that are not hot paraffin coated to facilitate cleaning. Mix in accordance with manufacturer's instructions. Install epoxy grout in compliance with current revisions of ANSI A108.02 (3.13) and ANSI A108.6 (3.0 - 4.0). Spread using a sharp edged, hard rubber float and work grout into joints. Using strokes diagonal (at 45° angle) to the grout lines, pack joints full and free of voids/pits. Then hold float face at a 90° angle to grouted surface and use float edge to "squeegee" off excess grout, stroking diagonally to avoid pulling grout out of filled joints. Once excess grout is removed, a thin film/haze will be left. Initial cleaning of the remaining film/haze can begin approximately 20-30 minutes after grouting (wait longer at colder temperatures). Begin by mixing cleaning additive packet with 2 gallons of clean water in a clean bucket to make cleaning solution. Dip a clean sponge into the bucket and then wring out cleaning solution until sponge is damp. Using a circular motion, lightly scrub grouted surfaces with the damp sponge to dissolve grout film/haze. Then drag sponge diagonally over the scrubbed surfaces to remove froth. Rinse sponge frequently and change cleaning solution at least every 50 ft². Discard sponges as they become "gummy" with residue. Within one (1) hour of finishing first cleaning, clean the same area again following the same procedure but utilizing a clean white scrub pad and fresh cleaning solution. Rinse scrub pad frequently. Drag a clean sponge diagonally over the scrubbed surfaces to remove froth. Use each side of sponge only once before rinsing and change cleaning solution at least every 50 ft². Allow cleaned areas to dry and inspect tile/stone surface. For persistent grout film/haze (within 24 hours), repeat scrubbing procedure with undiluted white vinegar and clean pad. Rinse with clean water and allow surface to dry. Inspect grout joint for pinholes/voids and repair them with freshly mixed epoxy grout. Cautions: Do not use undiluted white vinegar on polished marble or limestone unless a test spot in an inconspicuous area indicates no change in finish appearance; do not use acid cleaners on epoxy grout less than 7 days old.

B. Interior Walls

1. Install water resistant gypsum board coated glass mat water resistant gypsum backer board under Section 09 29 00.
2. Install the waterproofing membrane in compliance with current revisions of ANSI A108.1 (2.7 Waterproofing) and ANSI A108.13.
 - a) Pre-Treat Cracks and Joints - Fill all substrate cracks, cold joints and control joints to a smooth finish using latex-fortified thin-set. Apply a liberal coat of waterproofing membrane approximately 8" wide over substrate cracks, cold joints, and control joints.

- b) Pre-Treat Coves and Floor/Wall Intersections - Fill all substrate coves and floor/wall transitions to a smooth finish and changes in plane using latex-fortified thin-set. Apply a liberal coat of waterproofing membrane approximately 8" wide over substrate cracks, cold joints, and control joints using a paint brush or heavy napped paint roller.
- c) Pre-Treat Drains - Drains must be of the clamping ring type, with weepers as per ASME A112.6.3. Apply a liberal coat of waterproofing membrane around and over the bottom half of drain clamping ring. Cover with a second liberal coat of waterproofing membrane. When the waterproofing membrane dries, apply a bead of sealant where the waterproofing membrane meets the drain throat. Install the top half of drain clamping ring.
- d) Pre-Treat Penetrations - Allow for a minimum 1/8" space between drains, pipes, lights, or other penetrations and surrounding ceramic tile, stone or brick. Pack any gaps around pipes, lights or other penetrations with latex-fortified thin-set. Apply a liberal coat of waterproofing membrane around penetration opening. Cover the first coat with a second liberal coat of waterproofing membrane. Bring waterproofing membrane up to level of tile or stone. When waterproofing membrane has dried to the touch seal with recommended sealant.
- e) Main Application - Allow any pre-treated areas to dry to the touch. Apply a liberal coat of waterproofing membrane with a paint brush or heavy napped roller over substrate including pre-treated areas and allow to dry to the touch. Install another liberal coat of Waterproofing membrane over the first coat. Let the top coat of Waterproofing membrane dry to the touch approximately 1 – 2 hours at 70°F (21°C) and 50% RH. When the top coat has dried to the touch inspect the surface for pinholes, voids, thin spots or other defects. Waterproofing membrane will dry to an olive green color when fully cured. Use additional Waterproofing membrane to seal any defects.
- f) Movement Joints - Apply a liberal coat of waterproofing membrane, approximately 8" wide over the areas. Then embed and loop the 6" wide waterproofing/anti-fracture fabric and allow the waterproofing membrane liquid to bleed through. Immediately apply a second coat of Waterproofing membrane.
- g) Liberal Coat: Where the term "liberal coat" is used above, dry coat thickness is 20 – 30 mil; consumption per coat is approximately 0.01 gal/ft²; coverage is approximately 100 ft²/gal.
- h) Protection - Provide protection for newly installed membrane, even if covered with a thin-bed ceramic tile, stone or brick installation against exposure to rain or other water for a minimum of 2 hours at 70°F and 50% RH. For temperatures between 45°F and 69°F allow a minimum 24 hour cure period.
- i) Flood Testing - Allow membrane to cure fully before flood testing, typically a minimum 2 hours at 70°F and 50% RH. Cold conditions will require a longer curing time. For temperatures between 50°F and 69°F allow a minimum 24 hour cure period prior to flood testing. Perform flood testing in accordance with manufacturer's requirements.

3. Install tile with latex portland cement thin bed mortar and epoxy grout as specified above.

3.05 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION