



# **Jefferson Transit Authority**

## **Maintenance, Operations, and Administration Center**


### **Bid Set**

**February 5, 2014**

**Volume 2 – Divisions 3 -13**

**Project # 2013-006**



TCF rchitecture



PROJECT MANUAL  
SPECIFICATIONS  
FOR  
**Jefferson Transit Authority**  
**Maintenance, Operations, & Administration**  
**Center**  
**Bid Set**  
**February 5, 2014**

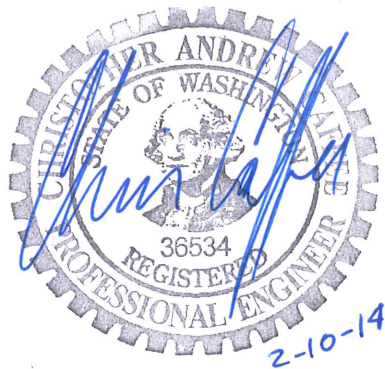


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The undersigned Engineer of Record hereby certifies that the Technical Specifications for the Mechanical portions of this Project for the Bid Set Submittal for the Jefferson Transit Authority - Maintenance, Operations, & Administration Center were written by me, or under my direct supervision, and that I am duly registered under the laws of the State of Washington and hereby affix my Professional Seal and signature. Those sections prepared under my supervision and being certified by my seal and signature below are all mechanical specifications in Divisions 20, 21, 22 and 23.





The undersigned Engineer of Record hereby certifies that the Technical Specifications for the Electrical portions of this Project for the Bid Set Submittal for the Jefferson Transit Authority - Maintenance, Operations, & Administration Center were written by me, or under my direct supervision, and that I am duly registered under the laws of the State of Washington and hereby affix my Professional Seal and signature. Those sections prepared under my supervision and being certified by my seal and signature below are all mechanical specifications in Divisions 26, 27, and 28.





The undersigned Engineer of Record hereby certifies that the Technical Specifications for the Civil portions of this Project for the Bid Set Submittal for the Jefferson Transit Authority – Maintenance, Operations, & Administration Center were written by me, or under my direct supervision, and that I am duly registered under the laws of the State of Washington and hereby affix my Professional Seal and signature. Those sections prepared under my supervision and being certified by my seal and signature below are all Civil specifications in Divisions 31, 32, and 33.



A handwritten signature in black ink, appearing to read "Amy M. Head", written over a horizontal line.





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2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials,  
8 mixture design, placement procedures, and finishes, for the following:

- 9 1. Footings.  
10 2. Foundation walls.  
11 3. Slabs-on-grade.  
12 4. Other concrete applications as indicated.

13 B. Related Sections:

- 14 1. Division 03 Section "Concrete Finishing" for coordination of specially finished concrete.  
15 2. Division 09 Section "Painting" for epoxy coatings on concrete slabs.  
16 3. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.  
17 4. Division 32 Section "Concrete Paving" for concrete pavement and walks.  
18 5. Structural Drawings General Notes

19 1.3 DEFINITIONS

- 20 A. Cementitious Materials: Portland cement alone or in combination with one or more of the  
21 following: blended hydraulic cement, fly ash, ground granulated blast-furnace slag, silica fume,  
22 and other pozzolans; subject to compliance with requirements.

23 1.4 ACTION SUBMITTALS

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

- 25 B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when  
26 characteristics of materials, Project conditions, weather, test results, or other circumstances  
27 warrant adjustments. See Structural General Notes for mix designs and additional requirements.

- 28 1. Indicate in submittal, and on delivery ticket, amounts of mixing water allowed for later  
29 addition at Project site, within approved mix design limits.

- 30 C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and  
31 placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar

- 1 diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing,  
2 and supports for concrete reinforcement.
- 3 D. Construction Joint Layout: Indicate proposed construction joints required to construct the  
4 structure.
- 5 1. Location of construction joints is subject to approval of the Architect.
- 6 E. Submittal – placing and jointing plan indicating location of construction, control and isolation  
7 joints.
- 8 F. Samples: For waterstops and vapor retarder.
- 9 G. Preinstallation Conference Agenda
- 10 1. Attendees
- 11 2. Order and Method of Construction
- 12 3. Safety
- 13 4. Notifications
- 14 5. Spares
- 15 6. Redundancy
- 16 7. Emergency Procedures
- 17 8. Other
- 18 1.5 INFORMATIONAL SUBMITTALS
- 19 A. Qualification Data: For Installer.
- 20 B. Welding certificates.
- 21 C. Material Certificates: For each of the following, signed by manufacturers:
- 22 1. Cementitious materials.
- 23 2. Admixtures.
- 24 3. Form materials and form-release agents.
- 25 4. Steel reinforcement and accessories.
- 26 5. Waterstops.
- 27 6. Curing compounds.
- 28 7. Floor and slab treatments.
- 29 8. Bonding agents.
- 30 9. Adhesives.
- 31 10. Vapor retarders.
- 32 11. Semirigid joint filler.
- 33 12. Joint-filler strips.
- 34 13. Repair materials.
- 35 D. Floor surface flatness and levelness measurements indicating compliance with specified  
36 tolerances.
- 37 E. Minutes of preinstallation conference.



1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician. An experienced installer who has completed concrete work similar in material, design and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications for Mix Design (Owner will employ testing agency for field testing): An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  - 1. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain each admixture from single source from single manufacturer.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures. Provide proof of testing and compliance.
- H. Mockups:
  - 1. Provide mock-ups for:
    - a. Jointing (all types)
    - b. Pour-backs at column block-outs
  - 2. See Section "Concrete Finishing" for mock-ups at polished concrete surfaces.

I. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture, and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

- a. Contractor's superintendent.
- b. Independent testing agency responsible for concrete design mixtures.
- c. Ready-mix concrete manufacturer.
- d. Concrete subcontractor.
- e. Concrete pumping company.
- f. Special concrete finish subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement, if any.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.

2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## 2.2 STEEL REINFORCEMENT

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

## 2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

## 2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project. See Structural Notes for additional information.

1. Portland Cement: ASTM C 150, Type I or II gray unless noted otherwise in Division 3 Section "Architectural Concrete" for finished color purposes. Supplement with the following:

a. Fly Ash:

1) Locally manufactured/extracted.

2) ASTM C 618, Class C. If used, proposed mixes containing Class F flyash shall be submitted for review and approval prior.

B. Slag Ground Granulated Blast Furnace (GGBF) slag shall conform to ASTM C989 Grade 100 or 120. GGBF shall not be permitted unless the mix designs to be used on the project are submitted for review and approval. Submitted mix designs shall include tested concrete strengths and tested values for concrete shrinkage at 28 days.

C. Normal-Weight Locally Extracted Aggregates: ASTM C 33, Class 1N coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal, except at exposed slabs (slabs exposed to view in final construction, such as stained, colored or polished concrete slabs) use 3/8 inch nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement as defined by ACI.

D. Water: ASTM C 94/C 94M and potable.

## 2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use in concrete floors to receive a polished finish. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2. Other Admixtures: The Contractor may propose other admixtures, for the Architects consideration. Such admixtures shall meet ASTM C494.

## 2.6 WATERSTOPS

A. Waterstops:

1. Manufacturer/Product:

a. Waterstop-RX bentonite waterstop and water-based adhesive as manufactured by Colloid Environmental Technologies Company (CETCO), [www.cetco.com](http://www.cetco.com), 847-392-5800; Waterstop-RX 101T.

b. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

2. Accessories: Provide all accessories, adhesives and other items as recommended by the manufacturer for a complete system.

## 2.7 VAPOR RETARDERS

A. Sheet Vapor Retarder (AKA Vapor Barrier): ASTM E 1745, Class A. Permeance as tested before and after mandatory conditioning (ASTM E 1745 Section 7.1 and sub-paragraphs 7.1.1-

7.1.5): less than 0.01 Perms (grains /(ft<sup>2</sup> x hr x in Hg)). Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Manufacturers / Products:

- a. Fortifiber Corporation; Moistop Ultra 15.
- b. Stego Industries, LLC.: Stego Wrap Vapor Barrier (15 mil).
- c. Griffolyn; Vapor Guard.
- d. Monarflex; Reflex Super.
- e. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

2.8 LIQUID FLOOR TREATMENTS

A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Concrete Sealer:

1. Manufacturer / Product: L&M Construction Chemicals, "PermaGuard SPS" installed with primer as/if recommended by the manufacturer, or approved substitute during the bid process per Specification Sections 002100 and 012500.
2. Installation: Follow manufacturer's printed instructions.
3. Locations: Install at interior exposed concrete slabs scheduled as "CS" (Clear Sealer). This applies only to exposed slabs that are not scheduled to receive polished concrete. Polished concrete floors have a different sealer system as specified in Division 3 Section "Concrete Finishing".

C. Penetrating Liquid Floor Treatment (Concrete Hardener): Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. ChemMasters; Chemisil Plus.
- b. ChemTec Int'l; ChemTec One.
- c. Conspec by Dayton Superior; Intraseal.
- d. Curecrete Distribution Inc.; Ashford Formula.
- e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
- f. Edoco by Dayton Superior; Titan Hard.
- g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
- h. Kaufman Products, Inc.; SureHard.
- i. L&M Construction Chemicals, Inc.; Seal Hard.
- j. Meadows, W. R., Inc.; LIQUI-HARD.
- k. Metalcrete Industries; Floorsaver.
- l. Nox-Crete Products Group; Duro-Nox.
- m. Symons by Dayton Superior; Buff Hard.
- n. US SPEC, Division of US Mix Products Company; US SPEC Industraseal.
- o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.

p. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

2. Locations: Install at interior exposed concrete slabs scheduled as “CH” (Concrete Hardener). This applies only to exposed slabs that are not scheduled to be stained, colored, or polished concrete. Stained, colored or polished concrete floors have a different sealer system as specified in Division 3 Section “Concrete Finishing”.

## 2.9 CURING MATERIALS

A. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete. Do not use where product will adversely affect the dealer-specified concrete, hardener or finished flooring product. Do not use on concrete to receive polished or colored concrete finish.

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. Axim Italcementi Group, Inc.; CATEXOL CimFilm.
- b. BASF Construction Chemicals - Building Systems; Confilm.
- c. ChemMasters; SprayFilm.
- d. Conspec by Dayton Superior; Aquafilm.
- e. Dayton Superior Corporation; Sure Film (J-74).
- f. Edoco by Dayton Superior; BurkeFilm.
- g. Euclid Chemical Company (The), an RPM company; Eucobar.
- h. Kaufman Products, Inc.; Vapor-Aid.
- i. Lambert Corporation; LAMBCO Skin.
- j. L&M Construction Chemicals, Inc.; E-CON.
- k. Meadows, W. R., Inc.; EVAPRE.
- l. Metalcrete Industries; Waterhold.
- m. Nox-Crete Products Group; MONOFILM.
- n. Sika Corporation; SikaFilm.
- o. SpecChem, LLC; Spec Film.
- p. Symons by Dayton Superior; Finishing Aid.
- q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
- r. Unitex; PRO-FILM.
- s. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.

C. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

D. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

E. Water: Potable.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering. Do not use on concrete that is scheduled to receive a polished or colored concrete finish, or where the curing compound might adversely impact adhesion of the applied finish flooring materials. .

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. BASF Construction Chemicals - Building Systems; Kure-N-Seal W.
- b. ChemMasters; Safe-Cure Clear.
- c. Conspec by Dayton Superior; High Seal.
- d. Dayton Superior Corporation; Safe Cure and Seal (J-19).
- e. Edoco by Dayton Superior; Spartan Cote WB II 20 Percent.
- f. Euclid Chemical Company (The), an RPM company; Diamond Clear VOX; Clearseal WB STD.
- g. Kaufman Products, Inc.; SureCure Emulsion.
- h. Lambert Corporation; Glazecote Sealer-20.
- i. L&M Construction Chemicals, Inc.; Dress & Seal WB.
- j. Meadows, W. R., Inc.; Vocomp-20.
- k. Metalcrete Industries; Metcure 0800.
- l. Nox-Crete Products Group; Cure & Seal 200E.
- m. Symons by Dayton Superior; Cure & Seal 18 Percent E.
- n. Vexcon Chemicals, Inc.; Starseal 0800.

G. Contractor to identify what curing method is to be used for each portion of the concrete work.

## 2.10 JOINT FILLER FOR EXPOSED SLABS CONTRACTION / CONTROL JOINTS

A. See Division 3 Section “Concrete Finishing”.

## 2.11 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.12 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.
5. At areas of exposed concrete floors to receive a polished, stained or colored concrete finish, confirm acceptability of slab repair materials and procedures with Architect and floor finish subcontractor prior to proceeding. Damage to slabs may require replacement rather than repair.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.
5. At areas of exposed concrete floors to receive a polished, stained or colored concrete finish, confirm acceptability of slab repair materials and procedures with Architect and floor finish subcontractor prior to proceeding. Damage to slabs may require replacement rather than repair.

2.13 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301. See Structural General Notes for mix designs and additional requirements.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows (% replacement equals weight of supplementary cementitious material divided by total cementitious material times 100.):



1. Fly Ash (Optional): 25 percent maximum. Do not use fly ash at floor slabs to receive a polished, stained or colored concrete finish.
2. Combined Fly Ash and Pozzolan: A minimum of 50 pounds per cubic yard, and a maximum of 25 percent (unless a higher percentage is approved by the architect and structural engineer) if fly ash is locally commercially available at the time of installation. Do not use fly ash at floor slabs to receive a polished, stained or colored concrete finish.
3. See Structural General Notes for additional admixtures and requirements at exposed slabs that are polished, colored, or stained.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

## 2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: As indicated on Structural Drawings at 28 days.
2. Maximum Water-Cementitious Materials Ratio: As indicated on Structural Drawings.
3. Air Content: As indicated on Structural Drawings.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: As indicated on Structural Drawings at 28 days.
2. Maximum Water-Cementitious Materials Ratio: As indicated on Structural Drawings.
3. Air Content: As indicated on Structural Drawings.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: As indicated on Structural Drawings at 28 days.
2. Maximum Water-Cementitious Materials Ratio: As indicated on Structural Drawings.
3. Air Content: As indicated on Structural Drawings.
4. Shrinkage Reducers: See Structural General Notes.
5. Slab Hardener (Buildings A through C): See project specifications.

## 2.15 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.16 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Not allowed.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class C, 1/2 inch (13 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Do not chamfer exterior corners and edges of permanently exposed concrete, unless detailed otherwise.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

- 1 J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and  
2 other debris just before placing concrete.
- 3 K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and  
4 maintain proper alignment.
- 5 L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written  
6 instructions, before placing reinforcement. Do not use products that will adversely impact the  
7 finished appearance of the concrete or that are not compatible with finish coatings such as water  
8 repellent coatings, if any.

9 3.2 EMBEDDED ITEMS

- 10 A. Place and secure anchorage devices and other embedded items required for adjoining work that  
11 is attached to or supported by cast-in-place concrete. Use setting drawings, templates,  
12 diagrams, instructions, and directions furnished with items to be embedded.
- 13 1. Install anchor rods, accurately located, to elevations required and complying with  
14 tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and  
15 Bridges."  
16 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face  
17 of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and  
18 other conditions.

19 3.3 REMOVING AND REUSING FORMS

- 20 A. General: Formwork for sides of walls and similar parts of the Work that do not support weight  
21 of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for  
22 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-  
23 removal operations and curing and protection operations need to be maintained.
- 24 1. Remove forms only if shores have been arranged to permit removal of forms without  
25 loosening or disturbing shores.
- 26 B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or  
27 otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply  
28 new form-release agent.
- 29 C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.  
30 Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete  
31 surfaces unless approved by Architect.

32 3.4 SHORES AND RESHORES

- 33 A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of  
34 shoring and reshoring.
- 35 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

### 3.5 VAPOR RETARDERS

- A. Sheet Vapor Retarders (AKA Vapor Barrier): Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions. Place over capillary break at all new interior concrete slabs, and other locations indicated.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
2. Seal to penetrations at pipes, conduits, and all other penetrations.

### 3.6 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.7 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete. Do not use keyed joints in slabs less than seven (7) inches thick, unless placed in thickened slab edges.
3. Locate horizontal joints in walls at the top of footings or floor slabs.

4. Space vertical joints in walls as indicated on structural drawings. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction / Control Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas at the maximum spacing indicated on the structural drawings. Coordinate joint locations with architectural drawings at all locations exposed to view. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, and as follows:
1. Sawed Joints - General: At all floors form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
  2. Sawed Joints – Exposed Slabs: At slabs exposed to view in the final construction (those slabs not covered by a finished flooring system), such as slabs with a stained, colored or polished or clear sealer finish, comply with the following:
    - a. Joints shall be cut within 2 hours of completion of final troweling, using soft-cut or early-entry saws. The saw-cut joint shall be 1 inch to 1-3/16 inch deep. Contractor shall provide multiple saws on job as required to comply with 2 hour limit.
    - b. Joints shall be carefully placed for exact location and alignment as shown on drawings for exposed slabs.
    - c. Sawed Joint Terminations: At exposed slabs, joints shall be cut to the face of all walls, columns or other terminations to the greatest degree possible, and where not feasible, shall stop no more than one inch away from the surface.
    - d. Joint Filler: Install specified joint filler in all joints in polished, stained, colored and sealed concrete floors following the manufacturer's recommendations. Contractor to install at other exposed floors. Install flush with top of slab.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
  2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
  3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Dowels to be placed parallel to each other, parallel to the surface, and parallel to the plane of movement. Lubricate whole dowel, double coating of paraffin based curing compound in quality lubricant.

3.8 WATERSTOPS

- A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.9 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

- B. At polished, stained or colored concrete floors, do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect. For all other concrete, do not add water to concrete during delivery, at Project site, or during placement unless approved by the testing agency.

- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- E. Deposit and consolidate concrete for slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
4. For curing during cold weather, maintain concrete temperatures above 40 degrees F and humidity >100% for minimum days as recommended by ACI.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

### 3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

C. Comply with finishes used in approved mock-up.

### 3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.

1. Apply scratch finish to surfaces to receive concrete floor toppings, and to receive mortar setting beds for bonded cementitious floor finishes.

- 1 C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small  
2 or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots.  
3 Repeat float passes and restraightening until surface is left with a uniform, smooth, granular  
4 texture.
- 5 1. Apply float finish to surfaces to receive trowel finish
- 6 D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by  
7 hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of  
8 trowel marks and uniform in texture and appearance. Grind smooth any surface defects that  
9 would telegraph through applied coatings or floor coverings.
- 10 1. Unless noted otherwise, apply a trowel finish to surfaces exposed to view, to be covered  
11 with resilient flooring, carpet, and ceramic or quarry tile set over a cleavage membrane.
- 12 2. Do not over-trowel concrete surface at polished, stained or colored concrete floors.  
13 Trowel to level for optimal surface condition for colored and polished concrete finish  
14 application. Coordinate with polished/stained concrete material manufacturer and  
15 installer.
- 16 3. Finish surfaces to the following tolerances, according to ASTM E 1155  
17 (ASTM E 1155M), for a randomly trafficked floor surface:
- 18 a. Carpeted Floors: Specified overall values of flatness, F(F) 25; and of levelness,  
19 F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.
- 20 b. Hard Surface Flooring, such as VCT, Ceramic Tile, Sheet Vinyl, Rubber Tile, etc.:  
21 Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with  
22 minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-  
23 grade.
- 24 c. Hard Surface Flooring, such as VCT, Ceramic Tile, Sheet Vinyl, Rubber Tile, etc.:  
25 Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with  
26 minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for  
27 suspended slabs.
- 28 d. All Exposed Concrete Floors such as Sealed Concrete and Stained, Colored or  
29 Polished Concrete Floors: Specified overall values of flatness, F(F) 45; and of  
30 levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and of  
31 levelness, F(L) 24.
- 32 e. Finish Floor Flatness at Walls: No “dip” will be allowed at walls.
- 33 E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry  
34 tile is to be installed by either thickset or thin-set method, and other locations indicated. While  
35 concrete is still plastic, slightly scarify surface with a fine broom.
- 36 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- 37 F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, sidewalks, ramps,  
38 and elsewhere as indicated.
- 39 1. Provide a mock-up area to determine broom finish appearance acceptable to the Architect  
40 prior to completing concrete finish work. Coordinate with Architect's representative to  
41 ensure acceptance of mock-up prior to pouring concrete.



3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.13 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: If acceptable to Architect, apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before trowel finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Keep wet for entire curing period. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- 1 a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive  
2 floor coverings.
- 3 b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive  
4 penetrating liquid floor treatments.
- 5 c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining  
6 cover or a curing compound that the manufacturer certifies will not interfere with  
7 bonding of floor covering used on Project.  
8
- 9 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller  
10 according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall  
11 within three hours after initial application. Maintain continuity of coating and repair  
12 damage during curing period. Do not use on polished, stained or colored concrete floors  
13 or where compound will adversely impact adhesion of finished flooring materials.
- 14 a. Removal: After curing period has elapsed, remove curing compound without  
15 damaging concrete surfaces by method recommended by curing compound  
16 manufacturer unless manufacturer certifies curing compound will not interfere  
17 with bonding of floor covering used on Project.
- 18 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a  
19 continuous operation by power spray or roller according to manufacturer's written  
20 instructions. Recoat areas subjected to heavy rainfall within three hours after initial  
21 application. Repeat process 24 hours later and apply a second coat. Maintain continuity  
22 of coating and repair damage during curing period.
- 23 F. Preparation: At polished concrete floors, take necessary measures to prepare slab for polishing  
24 system application, including but not limited to floor repair, cleaning, and other measures  
25 required to properly prepare the slab as recommended by the polishing system manufacturer.  
26 Inspect slab with manufacturer's representative, subcontractor and Architect prior to the  
27 commencement of preparation activities.
- 28 3.14 LIQUID FLOOR TREATMENTS
- 29 A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor  
30 treatment according to manufacturer's written instructions.
- 31 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and  
32 complete surface repairs.
- 33 2. Do not apply to concrete that is less than seven days' old.
- 34 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet;  
35 and repeat brooming or scrubbing. Rinse with water; remove excess material until  
36 surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- 37 B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to  
38 hardened concrete by power spray or roller according to manufacturer's written instructions.

3.15 PROTECTIVE COATINGS INSTALLATION

- A. Clear Sealer at Concrete Floors: Prepare, apply, and finish clear sealers according to manufacturer's written instructions.
1. Remove curing compounds, sealers, oils. Dirt, laitance, and other contaminants and complete surface repairs.
  2. Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application or as otherwise recommended by manufacturer for appearance acceptable to Architect. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period. Do not use on polished concrete floors or where compound will adversely impact adhesion of finished flooring materials.
- B. Sealers at Polished Concrete Floors: furnished and installed under Division 3 Section "Concrete Finishing."
- C. Epoxy Coatings: furnished and installed under Division 9 Section "Painting".

3.16 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.
- D. Install liquid joint filler in saw cut joints in slabs exposed to view following the manufacturer's recommendations. Install flush to top of slab.
- E. Install cementitious material in saw-cut joints covered by a floor covering, as specified in Division 3 Section "Grout and Underlayments" and per Division 9 sections.

3.17 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

- 1 C. At areas of exposed concrete floors to receive a polished, stained or colored concrete finish,  
2 confirm acceptability of slab repair materials and procedures with Architect and floor finish  
3 subcontractor prior to proceeding. Damage to slabs may require replacement rather than repair.
- 4 D. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks,  
5 spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and  
6 stains and other discolorations that cannot be removed by cleaning.
- 7 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than  
8 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19  
9 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water,  
10 and brush-coat holes and voids with bonding agent. Fill and compact with patching  
11 mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone  
12 plugs secured in place with bonding agent.
- 13 2. Repair defects on surfaces exposed to view by blending white portland cement and  
14 standard portland cement so that, when dry, patching mortar will match surrounding  
15 color. Patch a test area at inconspicuous locations to verify mixture and color match  
16 before proceeding with patching. Compact mortar in place and strike off slightly higher  
17 than surrounding surface.
- 18 3. Repair defects on concealed formed surfaces that affect concrete's durability and  
19 structural performance as determined by Architect.
- 20 E. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and  
21 verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces  
22 sloped to drain for trueness of slope and smoothness; use a sloped template.
- 23 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts,  
24 honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or  
25 that penetrate to reinforcement or completely through unreinforced sections regardless of  
26 width, and other objectionable conditions.
- 27 2. After concrete has cured at least 14 days, correct high areas by grinding. At polished,  
28 concrete floors, confirm acceptable repair with Architect and Owner's subcontractor.
- 29 3. Correct localized low areas during or immediately after completing surface finishing  
30 operations by cutting out low areas and replacing with patching mortar. Finish repaired  
31 areas to blend into adjacent concrete.
- 32 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment.  
33 Prepare, mix, and apply repair underlayment and primer according to manufacturer's  
34 written instructions to produce a smooth, uniform, plane, and level surface. Feather  
35 edges to match adjacent floor elevations.
- 36 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low  
37 areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent  
38 floor elevations. Prepare, mix, and apply repair topping and primer according to  
39 manufacturer's written instructions to produce a smooth, uniform, plane, and level  
40 surface.
- 41 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in  
42 diameter, by cutting out and replacing with fresh concrete. Remove defective areas with  
43 clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm)  
44 clearance all around. Dampen concrete surfaces in contact with patching concrete and  
45 apply bonding agent. Mix patching concrete of same materials and mixture as original  
46 concrete except without coarse aggregate. Place, compact, and finish to blend with  
47 adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

F. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

G. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.18 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports, except as noted below.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
  - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Architect will evaluate results and make determination of compliance, repairs, etc. and the determination of the Architect/Owner will be final. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

- 1           6.     Compression Test Specimens: ASTM C 31/C 31M.
  - 2               a.     Cast and laboratory cure two sets of two standard cylinder specimens for each
  - 3                 composite sample.
  - 4               b.     Cast and field cure two sets of two standard cylinder specimens for each composite
  - 5                 sample.
- 6           7.     Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured
- 7                 specimens at 7 days and one set of two specimens at 28 days.
  - 8               a.     Test one set of two field-cured specimens at 7 days and one set of two specimens
  - 9                 at 28 days.
  - 10              b.     A compressive-strength test shall be the average compressive strength from a set of
  - 11                 two specimens obtained from same composite sample and tested at age indicated.
- 12           8.     When strength of field-cured cylinders is less than 85 percent of companion laboratory-
- 13                 cured cylinders, Contractor shall evaluate operations and provide corrective procedures
- 14                 for protecting and curing in-place concrete.
- 15           9.     Strength of each concrete mixture will be satisfactory if every average of any three
- 16                 consecutive compressive-strength tests equals or exceeds specified compressive strength
- 17                 and no compressive-strength test value falls below specified compressive strength by
- 18                 more than 500 psi (3.4 MPa).
- 19           10.    Test results shall be reported in writing to Architect, concrete manufacturer, and
- 20                 Contractor as soon as possible, but in no case greater than 48 hours after testing. Reports
- 21                 of compressive-strength tests shall contain Project identification name and number, date
- 22                 of concrete placement, name of concrete testing and inspecting agency, location of
- 23                 concrete batch in Work, design compressive strength at 28 days, concrete mixture
- 24                 proportions and materials, compressive breaking strength, and type of break for both 7-
- 25                 and 28-day tests.
- 26           11.    Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may
- 27                 be permitted by Architect but will not be used as sole basis for approval or rejection of
- 28                 concrete.
- 29           12.    Additional Tests: Testing and inspecting agency shall make additional tests of concrete
- 30                 when test results indicate that slump, air entrainment, compressive strengths, or other
- 31                 requirements have not been met, as directed by Architect. Testing and inspecting agency
- 32                 may conduct tests to determine adequacy of concrete by cored cylinders complying with
- 33                 ASTM C 42/C 42M or by other methods as directed by Architect.
- 34           13.    Additional testing and inspecting, at Contractor's expense, will be performed to determine
- 35                 compliance of replaced or additional work with specified requirements.
- 36           14.    Correct deficiencies in the Work that test reports and inspections indicate do not comply
- 37                 with the Contract Documents.
- 38           D.     Contractor shall measure floor and slab flatness and levelness according to ASTM E 1155
- 39                 (ASTM E 1155M) within 48 hours of finishing, and provide Architect with proof of
- 40                 compliance.

- 1    3.19    PROTECTION OF LIQUID FLOOR TREATMENTS AND SEALERS
- 2        A.    Protect liquid floor treatment from damage and wear during the remainder of construction
- 3               period. Use protective methods and materials, including temporary covering, recommended in
- 4               writing by liquid floor treatments installer.
- 5    END OF SECTION 033000





1 SECTION 033519 – CONCRETE FINISHING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. This Section specifies concrete polishing with sealers and hardeners associated with the  
8 polishing system.

- 9 B. Related Sections include the following:

- 10 1. Division 03 Section "Cast-in-Place Concrete" for general building applications of  
11 specially finished concrete.

12 1.3 SUBMITTALS

- 13 A. Product Data: For each type of product indicated, include specifications, test data, technical  
14 data sheet, MSDS, surface preparation and application instructions, and maintenance and  
15 cleaning instructions.

- 16 B. Qualification Data: Information establishing the qualifications of installers and manufacturers  
17 as required in this Section.

18 1.4 QUALITY ASSURANCE

- 19 A. Manufacturer Qualifications: A firm experienced in concrete polishing and sealer products.

- 20 B. Source Limitations: Obtain each type of concrete sealer and hardener from a single  
21 manufacturer and concrete polishing from a single manufacturer.

- 22 C. Installer Qualifications: An experienced installer, who has completed concrete polishing  
23 work similar in type, design and extent to that indicated for this project and whose work has  
24 resulted in construction with a record of successful in-service performance. Installer shall have  
25 a minimum of 5 years of experienced with similar products and shall have successfully  
26 completed a minimum of 10 applications of specified stain and polishing products. The  
27 installer shall have all recommended training by the manufacturer, and shall be acceptable to the  
28 manufacturer. Provide letter stating such.

- 29 D. Manufacturer's Representative: The concrete polishing manufacturer's technical representative  
30 shall attend the preinstallation meeting, shall be on-site the first full day of polishing operations,  
31 shall make periodic site inspections thereafter, and shall provide written reports to the

Contractor, Owner and Architect for every visit documenting his/her observations, corrective directions given, and photographs taken. The report shall be provided within 5 working days of the visit.

E. Mockups: Before proceeding with polishing of areas to receive concrete polishing, provide mockup test area to demonstrate concrete polishing finish, control joints with filler, hardeners and sealers, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Build mockups of typical interior concrete slab with polished and sealed concrete finish, a minimum of 4 x 8 feet, including sample construction and control joints. Repeat until such time as the Architect is satisfied with the finished appearance.
3. In presence of Architect, damage part of the exposed-face mock-up surface and demonstrate materials and techniques proposed for repair of surface blemishes to match adjacent undamaged surfaces.
4. Obtain Architect's approval of mockups before proceeding with full installation.

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

1. Require representatives of each entity directly concerned with cast-in-place concrete and concrete stain installation to attend, including the following:

- a. Contractor's superintendent.
- b. Concrete subcontractor.
- c. Concrete polishing manufacturer's representative.
- d. Concrete supplier.
- e. Owner's testing agency.
- f. Owner.
- g. Architect.

2. Review concrete finishes, curing procedures, concrete repair procedures, concrete protection, concrete control joint procedures and requirements, surface preparation, sealing and polishing application, protection, appearance requirements, and coordination with other work. Safety, notifications, emergency procedures, redundancy/spares, etc.?

G. Test Reports: Prepared by an independent testing laboratory, confirming compliance with specified performance criteria.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name, lot number, date of manufacture, etc.?

B. Store sealers and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store materials in a clean, dry area indoors in accordance with manufacturer's instructions. Keep containers sealed until ready for use.

1. Concrete Floor Hardener / Sealer: Keep away from ignition sources. Do not allow to freeze.

C. Handling: Protect materials during handling and application to prevent damage or contamination.

## 1.6 PROJECT CONDITIONS

A. Maintain air and surface temperatures within range recommended by manufacturer, but not less than 40 deg F or more than 85 deg F, in spaces to receive concrete stain, and not less than 55 deg F or more than 85 deg F, in spaces to receive sealers during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Cure concrete for a minimum of 45 days before commencing with polishing system.

C. After post-installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

D. Close spaces to traffic during stain and polishing installation.

E. Close spaces to traffic for 48 hours after installation.

F. Perform polishing after other finishing operations, including painting, have been completed, except "initial grind" which may be completed earlier. Install wall base material after sealers and hardeners are completed and cured.

## 1.7 WARRANTY

A. Special Installer's Warranty: Polished Concrete System Installer's warranty, signed by Installer, in which Installer agrees to repair floors that fail in materials or workmanship within specified warranty period.

1. The system shall remain hardened, dust proof and water-repellent for the warranty period.
2. Warranty Period: Ten (10) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 CONCRETE POLISHING/HARDENING/SEALING

A. System Basis-of-Design Product: The system design is based on the RetroPlate System, manufactured by Advanced Floor Products, 801-812-3420, [www.retroplatesystem.com](http://www.retroplatesystem.com). Installation shall be by a certified RetroPlate applicator only. Subject to compliance with requirements, provide the basis of design product, or comparable product by one of the following:

1. Perma-Shine.
  2. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
- B. Concrete Hardner / Sealer: “RetroPlate 99”, or an equivalent product from an approved manufacturer.
1. Finish: Level 2 - Hard Shell Medium Sheen
- C. Performance Criteria:
1. Abrasion resistance: ASTM C779 – up to 400% increase in abrasion resistance.
  2. Impact Strength: ASTM C805 – Up to 21% increase in impact strength.
  3. Ultra Violet Light and Water Spray: ASTM G23-81 – No adverse Affect to ultra violet light and water spray.
  4. Reflectivity: Up to 30% increase in reflectivity.
  5. Weathering: ASTM G23-81: No adverse effect to ultraviolet light and water spray
- D. Slip Resistance: Floor shall meet national ANSI A117 Standards for slip resistance. Co-efficient of friction: ASTM 1028.
- E. Modified Acrylic Topcoat Sealer: “RetroGuard”, manufactured by Advanced Floor Products, or an equivalent product from an approved manufacturer compatible with approved concrete polishing system.
1. Installed by an applicator certified by the system manufacturer.
  2. UV Stable
  3. Capable of preventing acid staining

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of stain products.
  2. Proceed with installation only after unsatisfactory conditions have been corrected.
  3. Notify Architect and Contractor of all unsatisfactory conditions and proposed remedies.

#### 3.2 PREPARATION

A. Protection:

1. Protect walls and surrounding surfaces not to receive concrete floor sealers or hardeners.
2. Do not allow sealers or hardeners to come in contact with wood or metal surfaces, or other materials that might be damaged by sealers or hardeners.

- 1           3.    No satisfactory procedure is available to remove petroleum stains from concrete.
- 2                Remove and replace any concrete that receives a petroleum stain during construction.
- 3           4.    Diaper all hydraulic equipment to be moved over slabs that are to receive polishing
- 4                system.
- 5           5.    Do not park vehicles over slabs to receive polishing system.
- 6           6.    Do not cut pipe over slabs to receive polishing system.
- 7           7.    Do not place steel on slabs to receive polishing system (to avoid rust stains).
- 8           8.    Use non-marking tires on all equipment.
- 9           9.    Close areas to traffic during polishing process.
- 10        B.    Prepare substrates according to manufacturer's written recommendations to ensure adhesion of
- 11                stain products.
- 12        C.    Concrete shall be as specified in Division 3 Sections "Cast-In-Place Concrete". See structural
- 13                plans and notes for additional requirements at exposed slabs including added reinforcing and
- 14                additional curing requirements. Plan on allowing concrete to cure a minimum of 60 days.
- 15                Provide temporary heat as necessary to facilitate slab curing. Test for moisture prior to the stain
- 16                application, using relative humidity probe according to ASTM 2170. Readings must be 80%
- 17                or below before applying the sealer. Calcium Chloride Test of 3lbs/1000 sq ft/24hr is also
- 18                acceptable. Manufacturer's recommendations for application shall supercede these
- 19                requirements.
- 20        D.    Concrete Substrates:
- 21                1.    Verify that slab meets specified surface flatness.
- 22                2.    Verify concrete surface is clean, dry, structurally sound, and free from dirt, dust, oil,
- 23                    grease, solvents, paint, wax, asphalt, concrete curing compounds, sealing compounds,
- 24                    surface hardeners, bond breakers, adhesive residue, and other surface contaminants.
- 25                3.    Do not acid wash or use heavy alkali cleaners.
- 26                4.    Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed
- 27                    with installation only after substrates pass testing.
- 28                5.    Moisture Testing:
- 29                    a.    Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation
- 30                        only after substrates have maximum moisture-vapor-emission rate of 3 lb of
- 31                        water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
- 32                    b.    Perform tests recommended by manufacturer. Proceed with installation only after
- 33                        substrates pass testing.
- 34        E.    Remove substrate coatings and other substances that are incompatible with stain and that
- 35                contain soap, wax, oil, or silicone, using methods recommended by manufacturer.
- 36        F.    Use approved methods to fill cracks, holes, and depressions in substrates.
- 37        G.    Sweep, vacuum and mop clean substrates to be covered by stain products immediately before
- 38                installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and
- 39                dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 POLISHING AND STAIN INSTALLATION

A. Polished Concrete Floor Treatment: Apply polished concrete finish system to cured and prepared slabs to match accepted mockup.

1. Machine grind floor surfaces to receive polished finishes level and smooth and to depth required to reveal aggregate to match approved mockup. Grind floors to within ¼ inch of the finished wall surface at walls with a base material. At concrete block walls, grind all the way to the face of concrete block wall. Stage grinding such that initial grinding is done before steel stud walls are erected to assure grinding continues to face of studs. Immediately cover and protect floors by approved methods.

a. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete concrete polishing.

b. Grind concrete floors scheduled to receive a stained finish to a level 2, 800 diamond, “wax” finish, except as stair treads, grind to a 400 diamond finish.

c. At areas requiring hand grinding, complete to similar level and large machine grinding for uniform appearance.

2. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.

3. Continue polishing with progressively finer grit diamond polishing pads to gloss level to match approved mockup.

4. Control and dispose of waste products produced by grinding and polishing operations.

5. Neutralize and clean polished floor surfaces.

3.4 SEALER INSTALLATION

A. Polish concrete in accordance with manufacturer's instructions. Polished concrete to meet applicable code requirements for slip resistance.

1. Topcoat Sealer: Topcoat sealer system shall consist of two coats of RetroGuard. The RetroGuard shall be applied as received.

2. Each coat shall be applied at 1000 sq ft per gallon. Keep material containers closed when not in use to avoid contamination. Keep product from freezing.

3.5 CLEANING AND PROTECTION

A. Perform the following operations after completing stain and sealer installation, following manufacturers recommended curing times:

1. Protect stained concrete floor from damage during construction.

2. Protect concrete surfaces from foot traffic for a minimum of 24 hours.

3. Avoid washing concrete surfaces for a minimum of 48 hours.

4. Sweep and vacuum surfaces thoroughly.

5. Damp-mop surfaces to remove marks and soil.

B. Protect polished concrete floors from mars, marks, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

1. No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential.

a. All hydraulic powered equipment must be diapered to avoid staining of the concrete.

b. No trade may park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.

c. No pipe cutting machine may be used over the floor slab.

d. Steel shall not be placed on interior slab to avoid rust staining.

e. Acids and acidic detergents will not come into contact with slab.

f. All trades shall be informed that the slab must be protected at all times.

2. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.

3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over floor and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 033519





SECTION 036000 - GROUT AND UNDERLAYMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Grout not specified in other Sections, including:
  - a. Epoxy grout.
  - b. Grout for hollow-metal frame assemblies.
2. Patching underlayment for concrete slabs.

- B. Work in Other Sections

2. Grout for structural steel base plates specified in Division 05 Section "Structural Steel".
3. Grout for setting metal fabrications specified in Division 05 Section "Metal Fabrications".
4. Grout for tile work specified in Division 09 Section "Tiling".

- C. Related Sections: The following Sections contain requirements that relate to this Section.

1. Division 03 Section "Cast-in-Place Concrete".
2. Division 08 Section "Hollow Metal Doors and Frames".

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the conditions of the Contract and Division 01 Specification Sections.
- B. Brochures: Submit brochures and product data sheets for grout materials proposed for use in the work; obtain Architect's approval.
- C. Certificates: Submit certificates from the manufacturer attesting that grout materials meet the requirements specified herein.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver grout materials in unopened original containers with original labels thereon; keep sealed until containers and materials have been approved by Architect.
- B. Store materials in approved safe weathertight area; store and handle materials in a manner which will prevent the inclusion of foreign materials and damage by water or dampness.

1.5 PROJECT CONDITIONS

- A. Weather: Do not install grout materials when weather conditions jeopardize grout strength or curing, or when conditions fall outside of the manufacturer's recommendations for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Epoxy Grout

- 1. Master Builders "Paste LPL", or equivalent; mix in accord with manufacturer's instruction and recommendations for particular conditions of installation in each case.
- 2. Where a sand/epoxy mix is used, use only a blended sand mix as recommended by the epoxy manufacturer.

B. Grout for Hollow Metal Frame Assemblies

- 1. For Hollow Metal Frames Installed in Concrete and Masonry Walls:

- a. Provide ASTM C150 type I cement mixed with water to form stiff plastic putty, and ASTM C144 sand especially graded for masonry work; add clean water as required for workability. Use of water in the mix shall be only as necessary to achieve required strength - avoid excessively wet grout that can generate a corrosive environment for the hollow metal frame.

- b. Grout proportions by volume shall be:

Cement: 1 part.

Sand: 2 1/2 to 3 times sum of volumes of cement used.

- c. Mix for minimum of 5 minutes in a mechanical batch mixer.

- 2. For Hollow Metal Frames Installed in Wood or Metal Stud Framed Walls: U.S.G. "Red top" wood fiber gypsum plaster, or James Hardie "Hardikote Perlited Ready Mix" gypsum plaster, or approved substitute; mix in accord with manufacturer's instructions and recommendations for particular conditions of installation in each case; form stiff plastic mix as required for workability.

C. Patching Underlayment for Concrete Slabs:

1. Furnish “Mapei” Plani/Patch PRP 110 fast-setting, cement-based, polymer-modified patching compound, or approved substitute, having a minimum compressive strength at 28 days of 4,000 psi. Do not exceed ½” in thickness without approval of the manufacturer and Architect. Verify acceptability with various flooring manufacturers, and do not proceed where any objections or conflicts exist.

## PART 3 - EXECUTION

### 3.1 PREPARATION

#### A. Preparation of Surfaces

1. Clean all surfaces to receive grout free of dirt, oil, wax, asphalt, latex compounds, curing compounds, grease and loose material and any contaminant which might act as a bondbreaker.
2. All metal components to be in contact shall be de-rusted and free of paint or oils.
3. All concrete and masonry to come into contact with the grout shall be thoroughly saturated following manufacturer’s recommendations prior to placement of grout; remove excess water from voids just prior to grout placement.
4. Check that hollow metal door and relite frames are secured in place.

### 3.2 INSTALLATION

#### A. Grout Installation

1. General:
  - a. Install products where indicated; fill joints, voids, pockets, etc., completely full.
  - b. Finish exposed surfaces level and smooth.
  - c. Comply with manufacturer’s recommendations and limitations.
2. Additional Requirements for Epoxy Grouting;
  - a. Install epoxy grout fill around items recessed in floor slabs such as guardrails and similar items.
  - b. Install epoxy grout where grout is shown exposed at hollow metal door frames; install a minimum 1/2 inch depth.
  - c. Install epoxy grout at all stud holes in concrete copings; fill holes completely, flush with top surface of coping.
  - d. Install epoxy grout at all other locations indicated.
  - e. Exposed grouted surfaces shall be uniform in appearance and finished to match color and texture of adjacent existing concrete surface, to the satisfaction of the Architect.
3. Additional Requirements for Grouting Hollow Metal Frames:
  - a. Verify that all frames have a bituminous protective coating on the concealed portion prior to grouting.
  - b. Grout all exterior hollow metal doors and associated sidelite and transom frames around perimeter (jambs and head). Except as specified otherwise below, fill space

1 between substrate backup and frame full of grout. Do not fill vertical or horizontal  
2 mullions full of grout. At exterior side of frames, recess grout as required for  
3 subsequent installation of sealant and associated backing material.

- 4 c. Grout all interior hollow metal door and relite frames around perimeter (jambs and  
5 head). Except as specified otherwise below, fill space between substrate backup and  
6 frame full of grout, except hold back 1/2 inch from outer wall surface for finishing with  
7 epoxy grout as specified above, where grout is to be exposed in the finish wall surface.  
8 Do not fill vertical or horizontal mullins with grout.  
9 d. Tool exposed grout surfaces smooth to a uniform finish, as approved.  
10 e. Allow grout to fully cure prior to placement of frame.

11  
12 B. Underlayment Installation:

- 13  
14 1. Apply patching underlayment as specified above over properly prepared substrate as  
15 required to level and prepare concrete slabs for finished flooring installation, and to fill all  
16 concrete slab and topping slab control joints in interior concrete slab surfaces to receive  
17 resilient and carpet floor coverings and ceramic tile. Joints shall be finished flush with  
18 adjacent slab surfaces. Follow manufacturer's recommendations and installation  
19 instructions for mixing and installing underlayment.  
20 2. Remove all excess underlayment material from adjacent floor surfaces.

21  
22  
23 END OF SECTION 036000  
24

1 SECTION 051200 - STRUCTURAL STEEL FRAMING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Structural steel.  
9 2. Grout.

10 B. Related Sections:

- 11 1. Division 01 Section "Quality Requirements" for independent testing agency procedures  
12 and administrative requirements.  
13 2. Division 05 Section "Metal Fabrications" for miscellaneous steel fabrications and other  
14 metal items not defined as structural steel.  
15 3. Division 09 Section "High-Performance Coatings" for surface-preparation and priming  
16 requirements.  
17 4. Division 13 Section "Metal Building Systems" for structural steel associated with metal  
18 building systems.  
19 5. Structural Drawing General Notes.

20 1.3 DEFINITIONS

- 21 A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of  
22 Standard Practice for Steel Buildings and Bridges."

23 1.4 ACTION SUBMITTALS

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

- 25 B. Shop Drawings: Show fabrication of structural-steel components.

- 26 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.  
27 2. Include embedment drawings.  
28 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds,  
29 and show size, length, and type of each weld. Show backing bars that are to be removed  
30 and supplemental fillet welds where backing bars are to remain.  
31 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts.

- 1           5.     Include point loads for HVAC equipment, fall restraint supports, and other miscellaneous  
2           loads.

3   1.5     INFORMATIONAL SUBMITTALS

- 4       A.     Buy America: Certification that all steel components are provided in compliance with the Buy  
5       America requirements.
- 6       B.     Qualification Data: For qualified detailer, installer, and fabricator.
- 7       C.     Welding certificates and procedures manual.
- 8       D.     Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers,  
9       certifying that shop primers are compatible with topcoats.
- 10      E.     Mill test reports for structural steel, including chemical and physical properties.
- 11      F.     Product Test Reports: For the following:
- 12           1.     Shop primers.
- 13           2.     Nonshrink grout.
- 14      G.     Source quality-control reports.

15   1.6     QUALITY ASSURANCE

- 16      A.     Detailer Qualifications: A qualified detailer with minimum of five (5) years experience in  
17      structural steel detailing, including involvement in not less than three (3) public bid projects of  
18      similar, or greater, size and complexity. References for verification of experience will be  
19      required. Determination of adequacy of qualifications shall be at the sole discretion of the  
20      Architect.
- 21      B.     Fabricator Qualifications: A qualified fabricator having a minimum of five (5) years'  
22      experience in structural steel fabrication, including involvement in not less than three (3) public  
23      bid projects of similar, or greater, size and complexity. References for verification of  
24      experience will be required. Determination of adequacy of qualifications shall be at the sole  
25      discretion of the Architect.
- 26      C.     Installer Qualifications: A qualified installer having a minimum of five (5) years' experience in  
27      structural steel installation, including involvement in not less than three (3) public bid projects  
28      of similar, or greater, size and complexity. References for verification of experience will be  
29      required. Determination of adequacy of qualifications shall be at the sole discretion of the  
30      Architect.
- 31      D.     Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1  
32      or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting  
33      Applicators."
- 34      E.     Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M,  
35      "Structural Welding Code - Steel."

- F. Preinstallation Conference: Conduct conference at Project site. An important element of this discussion will be to develop an understanding of the erection tolerance verification that will occur.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.8 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another. Coordinate primers to be shop applied with the requirements of Division 9 Section "High-Performance Coatings".

- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

- B. W-Shapes: ASTM A992, Grade 50

- C. Misc. Shapes: ASTM A36,  $F_y = 36$  ksi

- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

1. Weight Class: As indicated on structural drawings.
  2. Finish: Black except where indicated to be galvanized.
- F. Welding Electrodes: E70 electrodes unless noted otherwise, comply with AWS requirements.
- 2.2 BOLTS, CONNECTORS, AND ANCHORS
- A. High-Strength Bolts, Nuts, and Washers: See Structural Notes.
  - B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
  - C. Anchor Rods: ASTM F1554 grade 36, class 2A typical. ASTM F1554 grade 105 where indicated. See also structural notes and braced frame details at foundations.
- 2.3 PRIMER
- A. Primer – Exposed Interior Steel: “TNEMEC Series 394 PerimePrime at 2.5 mils DFT applied per manufacturer’s recommended DFT/ct., or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
  - B. Primer - Interior Concealed Steel, except as noted herein: Fabricator’s standard lead – and chromate-free, nonasphaltic, rust inhibiting primer.
  - C. Primer – All Exterior Steel (Non-Galvanized): TNEMEC Series 394 PerimePrime”, @ 2.5 to 3.5 DFT/ct., or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
  - D. Galvanizing Repair Paint: Tnemec Series 394 PereimePrime, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
- 2.4 GROUT
- A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
  - B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
- 2.5 FABRICATION
- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
    1. Camber structural-steel members where indicated.
    2. Fabricate beams with rolling camber up.



3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections. 394 is a class b coating and is suitable for slip critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces, unless noted otherwise.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. Interior Primed Steel: SSPC-SP 3, "Power Tool Cleaning."
2. Exterior Steel: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm), unless indicated otherwise under primers section. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

## 2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize all items indicated on the drawings or herein to be galvanized.

## 2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing and Leveling Plates: Clean concrete- bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
  - 2. Weld plate washers to top of baseplate.
  - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.
  - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

### 3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

### 3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds, high-strength bolted connections, complete penetration welds, lateral frame welds, and structural steel erection tolerances.

B. Bolted Connections: Bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

- a. Liquid Penetrant Inspection: ASTM E 165.
- b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
- c. Ultrasonic Inspection: ASTM E 164.
- d. Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.

1            2.     Conduct tests on additional shear connectors if weld fracture occurs on shear connectors  
2                   already tested, according to requirements in AWS D1.1/D1.1M.

3        E.     Correct deficiencies in Work that test reports and inspections indicate does not comply with the  
4                   Contract Documents.

5    3.6       REPAIRS AND PROTECTION

6        A.     Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair  
7                   galvanizing to comply with ASTM A 780.

8        B.     Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or  
9                   missing and paint with the same material as used for shop painting to comply with SSPC-PA 1  
10                  for touching up shop-painted surfaces.

11           1.     Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool  
12                  cleaning.

13        C.     Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting  
14                   Sections.

15    END OF SECTION 051200



1 SECTION 054000 - COLD-FORMED METAL FRAMING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. This Section includes the following:

- 8 1. Load-bearing wall framing.  
9 2. Interior load-bearing wall framing.  
10 3. Exterior non-load-bearing wall framing.  
11 4. Ceiling joist framing.  
12 5. Soffit framing.

- 13 B. Related Sections include the following:

- 14 1. Division 06 Section "Sheathing" for gypsum sheathing products installed over framing in  
15 this Section.  
16 2. Division 07 Section "Metal Wall Panels" for coordination of specific blocking and  
17 backing requirements to be provided under this section for metal wall panels.  
18 3. Division 09 Section "Non-Structural Metal Framing" for interior non-load-bearing,  
19 metal-stud framing and ceiling-suspension assemblies.  
20 4. Division 09 Section "Gypsum Board" for interior non-load-bearing, metal-stud-framed,  
21 shaft-wall assemblies.  
22 5. Division 13 Section "Metal Building Systems" for primary building structure and girt  
23 framing carrying other metal framing specified in this section.  
24 6. Structural Drawing General Notes.

25 1.3 ACTION SUBMITTALS

- 26 A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

- 27 B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal  
28 framing; fabrication; and fastening and anchorage details, including mechanical fasteners.  
29 Show reinforcing channels, opening framing, supplemental framing, strapping, bracing,  
30 bridging, splices, accessories, connection details, and attachment to adjoining work.

31 1.4 INFORMATIONAL SUBMITTALS

- 32 A. Welding certificates.

- 1 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
2 America requirements.
- 3 C. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that  
4 each of the following complies with requirements, based on evaluation of comprehensive tests  
5 for current products:
  - 6 1. Vertical deflection clips.
  - 7 2. Horizontal drift deflection clips
  - 8 3. Miscellaneous structural clips and accessories.
- 9 D. Research/Evaluation Reports: For cold-formed metal framing.

10 1.5 QUALITY ASSURANCE

- 11 A. Product Tests: Mill certificates or data from a qualified independent testing agency indicating  
12 steel sheet complies with requirements, including base-metal thickness, yield strength, tensile  
13 strength, total elongation, chemical requirements, ductility, and metallic-coating thickness.
- 14 B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural  
15 Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- 16 C. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing  
17 identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and  
18 inspecting agency acceptable to authorities having jurisdiction.
- 19 D. AISI Specifications and Standards: Comply with AISI's "North American Specification for the  
20 Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel  
21 Framing - General Provisions."
  - 22 1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."
- 23 E. Comply with AISI's "Standard for Cold-Formed Steel Framing - Prescriptive Method for One  
24 and Two Family Dwellings."
- 25 F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in  
26 Division 01 Section "Project Management and Coordination."

27 1.6 DELIVERY, STORAGE, AND HANDLING

- 28 A. Protect cold-formed metal framing from corrosion, deformation, and other damage during  
29 delivery, storage, and handling.
- 30 B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid  
31 condensation.



1 PART 2 - PRODUCTS

2 2.1 MANUFACTURERS

3 A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering  
4 cold-formed metal framing that may be incorporated into the Work shall be members of Steel  
5 Stud Manufacturer's Association. They include, but are not limited to, the following:

- 6 1. Allied Studco.
- 7 2. AllSteel Products, Inc.
- 8 3. California Expanded Metal Products Company.
- 9 4. Clark Steel Framing.
- 10 5. Consolidated Fabricators Corp.; Building Products Division.
- 11 6. Craco Metals Manufacturing, LLC.
- 12 7. Custom Stud, Inc.
- 13 8. Dale/Incor.
- 14 9. Design Shapes in Steel.
- 15 10. Dietrich Metal Framing; a Worthington Industries Company.
- 16 11. Formetal Co. Inc. (The).
- 17 12. Innovative Steel Systems.
- 18 13. MarinoWare; a division of Ware Industries.
- 19 14. Quail Run Building Materials, Inc.
- 20 15. SCAFCO Corporation.
- 21 16. Southeastern Stud & Components, Inc.
- 22 17. Steel Construction Systems.
- 23 18. Steeler, Inc.
- 24 19. Super Stud Building Products, Inc.
- 25 20. United Metal Products, Inc.

26 2.2 MATERIALS

27 A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of  
28 preconsumer recycled content not less than 25 percent.

29 B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and  
30 coating weight as follows:

- 31 1. Grade: ST33H (ST230H) and ST50H (ST340H).
- 32 2. Coating: G60 (Z180), A60 (ZF180), AZ50 (AZ150), or GF30 (ZGF90).

33 C. Steel Sheet for Vertical Deflection and Drift Clips: ASTM A 653/A 653M, structural steel, zinc  
34 coated, of grade and coating as follows:

- 35 1. Grade: 50 (340), Class 1 or 2.
- 36 2. Coating: G60 (Z180).

2.3 LOAD-BEARING WALL FRAMING

- A. General: Thicknesses and Section Properties (if given) are minimums. See structural drawings for more specific requirements. Structural drawings shall supersede the requirements specified herein.
- B. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0329 inch (0.84 mm).
  2. Minimum Flange Width: 1-5/8 inches (41.3 mm).
  3. Section Properties: As indicated on Structural Drawings.
- C. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
  2. Minimum Flange Width: 1-1/4 inches (32 mm).
- D. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0329 inch (0.84 mm).
  2. Minimum Flange Width: 1-5/8 inches (41.3 mm).
  3. Section Properties: As indicated on Structural Drawings.

2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. General: Thicknesses and Section Properties (if given) are minimums. See structural drawings for more specific requirements. Structural drawings shall supersede the requirements specified herein.
- B. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Same minimum requirements as "Load-Bearing Wall Framing".
- C. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Same minimum requirements as "Load-Bearing Wall Framing".
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.054 inch (1.37 mm).
  2. Flange Width: 1 inch (25 mm) plus twice the design gap for other applications.

2.5 CEILING JOIST FRAMING

- A. General: Thicknesses and Section Properties (if given) are minimums. See structural drawings for more specific requirements. Structural drawings shall supersede the requirements specified herein.
- B. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched with enlarged service holes, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0329 inch (0.84 mm).
  2. Flange Width: 1-5/8 inches (41 mm).
  3. Section Properties: As indicated on Structural Drawings.

2.6 EXTERIOR WALL FURRING AND BLOCKING

A. "Z" Furring:

1. Base-Metal Thickness: 0.0329 inch (0.84 mm) minimum.
2. Size / Configuration: As indicated on the drawings. Provide in custom shapes and sizes if standard shapes and sizes are not available.

B. Hat Shaped, Rigid Furring Channels: ASTM C 645.

1. Base-Metal Thickness: 0.0329 inch (0.84 mm) minimum.
2. Size: 1/2 inch depth, unless indicated otherwise.

C. Blocking:

1. Base-Metal Thickness: 0.0329 inch (0.84 mm) minimum, unless a heavier gauge is required by the drawings or the application.
2. Type: As indicated on drawings, or otherwise required to complete required blocking application, and as required to meet the metal siding manufacturer's requirements. This includes all blocking requirements including but not limited to casework, toilet accessories, wall mounted equipment, requirements of Divisions 20 through 28, and all other needs.

2.7 SOFFIT FRAMING

A. Framing Members: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched with enlarged service holes, with stiffened flanges, and other shapes as detailed or required, and as follows:

1. Base-Metal Thickness: 0.0329 inch (0.84 mm) minimum. See structural drawings for additional requirements.
2. Flange Width: 1-1/4 inches (31.8 mm).

2.8 FRAMING ACCESSORIES

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

2.9 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 36, unless indicated otherwise on Structural Drawings.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.10 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

## 2.11 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
  - 1. Fabricate framing assemblies using jigs or templates.
  - 2. Cut framing members by sawing or shearing; do not torch cut.
  - 3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
  - 4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
  - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  - 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

### 3.3 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.

2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plates over web penetrations that exceed size of manufacturer's standard punched openings.

J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.4 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:

1. Anchor Spacing: 48 inches maximum (1220 mm), unless indicated otherwise on Drawings.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:

1. Stud Spacing: 16 inches (406 mm), unless indicated otherwise on Drawings.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, mechanical and electrical items, metal siding, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced as indicated on structural drawings. Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of 2 screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.

2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

3. Bridging: At contractor's option, proprietary bridging bars may be installed according to manufacturer's written instructions.

J. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.5 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:

1. Stud Spacing: 16 inches (406 mm) unless indicated otherwise on drawings.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support. See Structural Drawings for additional information.

1. Install single-leg deflection tracks and anchor to building structure.

2. Connect vertical deflection clips to studs and anchor to building structure.

3. Connect drift clips to cold formed metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and



- 1 thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to
- 2 stud webs or flanges.
- 3 a. Install solid blocking at 96-inch (2440-mm) centers, unless indicated otherwise on
- 4 drawings.
- 5 2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of
- 6 punched studs.
- 7 3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated
- 8 and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to
- 9 stud flanges and secure solid blocking to stud webs or flanges.
- 10 4. Bridging: At contractor's option, proprietary bridging bars may be installed according to
- 11 manufacturer's written instructions.
- 12 F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip
- 13 angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable
- 14 wall-framing system.
- 15 G. Install supplementary framing, blocking, backing, and bracing in stud framing indicated to
- 16 support fixtures, equipment, services, casework, metal siding, heavy trim, furnishings,
- 17 mechanical and electrical items, and similar work requiring attachment to framing.
- 18 3.6 JOIST INSTALLATION
- 19 A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to
- 20 supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- 21 B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position,
- 22 brace, and reinforce. Fasten joists to both flanges of joist track.
- 23 1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38
- 24 mm).
- 25 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers,
- 26 steel clip angles, or steel-stud sections as indicated on Shop Drawings.
- 27 3. Provide full depth blocking / bridging where indicated on structural drawings.
- 28 C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:
- 29 1. Joist Spacing: 16 inches (406 mm), unless indicated otherwise in Drawings.
- 30 D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or
- 31 another combination of connected joists as indicated on structural drawings.
- 32 E. Install joist reinforcement at interior supports with single, short length of joist section located
- 33 directly over interior support, with lapped joists of equal length to joist reinforcement, or as
- 34 indicated.
- 35 F. Install bridging at intervals indicated. Fasten bridging at each joist intersection as follows:
- 36 G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

### 3.7 SOFFIT FRAMING INSTALLATION

- A. Install perimeter track and/or framing sized to match framing, and as detailed. Align and securely anchor or fasten framing to supporting structure at corners, ends, and spacing indicated on Shop Drawings. Provide full depth blocking / bridging where indicated on structural drawings.

- B. Install framing level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten to structure and framing above.

- C. Space framing as indicated on drawings, and as follows:

1. Soffit Framing Spacing: 16 inches (406 mm) unless indicated otherwise in drawings.

- D. Install miscellaneous framing and connections, including closure pieces, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable framing assembly.

### 3.8 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

- B. Field and shop welds will be subject to testing and inspecting.

- C. Testing agency will report test results promptly and in writing to Contractor and Architect.

- D. Remove and replace work where test results indicate that it does not comply with specified requirements.

- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.9 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

### END OF SECTION 054000

1 SECTION 055000 - METAL FABRICATIONS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Steel framing and supports for toilet compartments.  
9 2. Steel framing and supports for overhead doors.  
10 3. Steel framing and supports for countertops.  
11 4. Steel framing and supports for mechanical and electrical equipment.  
12 5. Steel framing and supports for applications where framing and supports are not specified  
13 in other Sections.  
14 6. Miscellaneous steel trim.  
15 7. Steel bollards.  
16 8. Loose bearing and leveling plates for applications where they are not specified in other  
17 Sections.  
18 9. Steel down spouts and support brackets  
19 10. Steel gutter supports and spacer brackets.  
20 11. Steel sign posts.  
21 12. Steel protection at concrete curb.

- 22 B. Miscellaneous Steel Fabrications: In addition to these items specifically listed in item 'A'  
23 above, the work in this Section includes all items fabricated from iron, steel, and aluminum  
24 shapes, plates, bars, strips and pipes, which are not a part of structural steel or other metal  
25 systems in other sections of these specifications, whether specifically specified herein or not.

26 C. Products furnished, but not installed, under this Section:

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

32 D. Related Sections:

- 33 1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe  
34 sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.  
35 2. Division 05 Section "Structural Steel Framing."  
36 3. Division 05 Section "Metal Gratings."

4. Division 06 Sections for metal framing anchors and timber connectors.
5. Division 07 Section "Sheet Metal Flashing and Trim" for coordination of gutter support brackets and spacer bars with fabrication of gutters.
6. Division 09 Section "Painting" and Division 09 Section "High-Performance Coatings" for field painting of primers installed under this Section.
7. Division 10 Section "Signage" for coordination of sign posts provided in this section with signs.
8. Structural Drawing General Notes.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

### 1.4 ACTION SUBMITTALS

- A. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

- B. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Metal nosings and treads.
3. Paint products.
4. Grout.

- C. Shop Drawings: Shall be submitted for approval prior to fabrication. Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of all metal fabrications and their connections. Show anchorage and accessory items.

- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified professional engineer.

- B. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.

- C. Welding certificates.

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

3 1.6 QUALITY ASSURANCE

- 4 A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M,  
5 "Structural Welding Code - Steel."

- 6 B. Welding Qualifications: Qualify procedures and personnel according to the following:

- 7 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."  
8 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."  
9 3. AWS D1.6, "Structural Welding Code - Stainless Steel."

10 1.7 PROJECT CONDITIONS

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

13 1.8 COORDINATION

- 14 A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint  
15 and coating manufacturers' written recommendations to ensure that shop primers and topcoats  
16 are compatible with one another.

- 17 B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete.  
18 Furnish setting drawings, templates, and directions for installing anchorages, including sleeves,  
19 concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in  
20 concrete or masonry. Deliver such items to Project site in time for installation.

21 PART 2 - PRODUCTS

22 2.1 METALS, GENERAL

- 23 A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise  
24 indicated. For metal fabrications exposed to view in the completed Work, provide materials  
25 without seam marks, roller marks, rolled trade names, or blemishes.

26 2.2 FERROUS METALS

- 27 A. Recycled Content of Steel Products (Voluntary goal): Postconsumer recycled content plus one-  
28 half of preconsumer recycled content not less than 25 percent.

- 29 B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

- 30 C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, [Type 304.

- D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- E. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- F. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.
- G. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

## 2.3 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- E. Bronze Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).
- F. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).
- G. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).
- H. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.
- I. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

## 2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
  - 1. Provide stainless-steel fasteners for fastening aluminum.
  - 2. Provide stainless-steel fasteners for fastening stainless steel.
  - 3. Provide stainless-steel fasteners for fastening nickel silver.
  - 4. Provide bronze fasteners for fastening bronze.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).

1. Dome head fasteners where indicated.

D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Eyebolts: ASTM A 489.

F. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

G. Wood Screws: Flat head, ASME B18.6.1.

H. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).

I. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).

J. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

K. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

L. Post-Installed Anchors:

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

## 2.5 MISCELLANEOUS MATERIALS

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

B. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

D. Concrete: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

## 2.6 PRIMER

A. General: The following primers shall be used, unless specifically noted otherwise for the specific items listed in this Section.

1. Primer – Exposed Interior Steel: “PPG Pitt Guard DTR Epoxy Mastic Coatings 97-145 Series”, 4 to 7 mils DFT, or TNEMEC equivalent, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
2. Primer – All Exterior Steel (Non-Galvanized): PPG Pitt Guard Rapid Coat D-T-R Epoxy Coating 95-245, 5 to 7 mils DFT, or TNEMEC equivalent, or approved substitute during the bid process per Specification Section 01631.
3. Primer - Interior Concealed Steel, except as noted herein: Fabricator’s standard lead – and chromate-free, nonasphaltic, rust inhibiting primer, complying with LEED VOC limits.

B. Shop Primers: Provide primers same as specified in Division 5 Section “Structural Steel Framing”.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.7 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.



3. Remove welding flux immediately.
  4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

## 2.8 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
1. Fabricate units from slotted channel framing where indicated.
  2. Furnish inserts for units installed after concrete is placed.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated, and if not indicated, as recommended by partition manufacturer with attached bearing plates, anchors, and braces. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Galvanize miscellaneous framing and supports where indicated.
- E. Prime miscellaneous framing and supports if not indicated to be galvanized.

## 2.9 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.

B. Galvanize all shelf angles unless noted otherwise.

## 2.10 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim, unless indicated otherwise on the drawings.

D. Prime exterior miscellaneous steel trim where indicated.

## 2.11 STEEL BOLLARDS

A. Fabricate bollards from Schedule 40 steel pipe, unless indicated otherwise on the drawings.

1. Cap bollards with 1/4-inch- (6.4-mm-) thick steel plate, except where shown on drawings to be filled with concrete.
2. Where bollards are indicated to receive controls for door operators, provide necessary cutouts for controls and holes for wire.
3. Where bollards are indicated to receive light fixtures, provide necessary cutouts for fixtures and holes for wire.

B. Where bollard are indicated to be bolted to concrete slabs, fabricate bollards with 3/8-inch- (9.5-mm-) thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch (19-mm) anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

C. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch- (6.4 mm ) thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard.

D. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch (6.4-mm) wall-thickness steel tubing with an OD approximately 1/16 inch (1.5 mm) less than ID of bollards. Match drill sleeve and bollard for 3/4 inch (19 mm) steel machine bolt.

E. Finish: Hot dip galvanize, unless indicated otherwise.

- F. Where Bollards are indicated to be painted, prime bollards with TNEMEC Series N69 Epoxoline II, or PPG equivalent or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

2.12 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates after fabrication where indicated.
- C. Prime plates with TNEMEC series 394 primer or PPG equivalent or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500, except where indicated to be galvanized.

2.13 GUTTER SUPPORT BRACKETS AND SPACER BARS

- A. Material: Provide of galvanized steel bar, size as indicated on drawings.
- B. Bend to shapes required.
- C. Drill holes of size and in locations required, ready for installation under Section 076200.
- D. Hot dip galvanize after fabrication.
- E. Prime for field painting to match gutter.

2.14 STEEL DOWNSPOUTS AND ASSOCIATED BRACKETS

- A. Material: Provide of standard weight ASTM A120nsteel pipe, size and configuration as indicated on drawings.
- B. Provide with attachment brackets as indicated on drawings.
- C. All welds shall be continuous and ground smooth.
- D. Hot dip galvanize after fabrication.
- E. Hot dip galvanize all after fabrication. Prepare, prime, and paint only those specific downspouts indicated to be painted on drawings. Assembly shall then be cleaned and primed with PPG Pitt Guard Rapid Coat D-T-R Epoxy Coating 95-245, 5 to 7 mils DFT, or TNEMEC equivalent or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500. Field paint with High Performance coating per Division 9 Section “High Performance Coatings”, color as indicated on Color Schedule on drawings.

2.15 STEEL TRAFFIC CONTROL SIGNPOSTS

- A. Material: Provide of 3 inch round schedule 40 ASTM A120 steel pipe, length as required for mounting handicap parking and traffic control signs to heights above grade specified in Section Division 10 Section "Signage" and as indicated on Drawings.
- B. Drill holes of size and in locations required for signs as indicated, ready for installation of signs.
- C. Provide two ½ inch diameter by 1 ½ inch long studs welded to opposite sides of pipe, located approximately
- D. Furnish complete with welded cap plate as shown.
- E. Galvanize pipe inside and out after fabrication.
- F. If indicated on drawings as painted, prime for field painting.

2.16 STEEL WELD PLATES AND ANGLES

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

2.17 STEEL CURB PROTECTION

- A. Full rub rails with radius corners.
- B. Heavy 12-gauge galvanized steel plate construction.
- C. Double bracing on sidewalls.
- D. Adjustable top braces.
- E. Bottom braces bolt to the flanges.
- F. Joint line-up pins.
- G. Height as indicated on Drawings.

2.18 FINISHES, GENERAL

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

2.19 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.20 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified), unless indicated otherwise on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

### 3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

C. Support steel girders on solid grouted masonry, concrete, or steel columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

D. Install steel columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and

### 3.3 INSTALLING METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete, trowel concrete smooth, and allow concrete to cure seven days before installing.

1. Do not fill removable bollards with concrete.

B. Where shown, anchor bollards to concrete slab construction with expansion anchors. Provide four 3/4-inch (19-mm) bolts at each bollard unless otherwise indicated.

1. Embed anchor bolts at least 4 inches (100 mm) in concrete.

- 1 C. Where shown, anchor bollards in concrete with pipe sleeves preset and anchored into concrete  
2 or in formed or core-drilled holes not less than 8 inches (200 mm) deep and 3/4 inch (19 mm)  
3 larger than OD of bollard. Fill annular space around bollard solidly with nonshrink, nonmetallic  
4 grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout  
5 up approximately 1/8 inch (3 mm) toward bollard.
- 6 D. Where shown, anchor bollards in place with concrete footings. Center and align bollards in  
7 holes 3 inches (75 mm) above bottom of excavation. Place concrete and vibrate or tamp for  
8 consolidation. Support and brace bollards in position until concrete has cured.
- 9 E. Anchor internal sleeves for removable bollards in concrete by inserting into pipe sleeves preset  
10 into concrete. Fill annular space around internal sleeves solidly with nonshrink, nonmetallic  
11 grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout  
12 up approximately 1/8 inch (3 mm) toward internal sleeve.
- 13 F. Place removable bollards over internal sleeves and secure with 3/4-inch (19-mm) machine bolts  
14 and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner will furnish  
15 padlocks.
- 16 G. Fill bollards solidly with concrete, mounding top surface to shed water, except where shown  
17 with metal caps.
- 18 1. Do not fill removable bollards with concrete.

19 3.4 INSTALLING BEARING AND LEVELING PLATES

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

29 3.5 PIPE DOWNSPOUTS AND ASSOCIATED BRACKETS

- 30 A. Install at locations indicated on the drawings, securely attached as detailed.

31 3.6 INSTALLING SUPPORTS FOR TOILET PARTITIONS

- 32 A. Anchor supports securely to and rigidly brace from overhead building structure.

1     3.7     STEEL SIGN POSTS

2     A.     Install at the various site locations as shown for application of handicap stall signage and traffic  
3     control signage specified under Division 10 Section “Signage”; set in concrete as detailed or  
4     otherwise required for rigidity, and conforming to the following additional requirements.

- 5             1.     Do not set posts prior to final grading.  
6             2.     Drill holes for post footings in firm, undisturbed or compacted soil.  
7             3.     Place concrete around posts in a continuous pour, tamp for consolidation.  
8             4.     Check each post for vertical and top alignment.

9     3.8     MANUFACTURED ITEMS

10     A.     Standard Aluminum Access Ladders: Install at all aluminum ladder locations shown, securely  
11     anchored to wall and/or floor construction as required. Following manufacturer’s installation  
12     instructions and recommendations; refer also to drawings and details.

13     3.9     ADJUSTING AND CLEANING

14     A.     Touchup Painting: Immediately after erection, clean field welds, bolted connections, and  
15     abraded areas. Paint uncoated and abraded areas with the same material as used for shop  
16     painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

- 17             1.     Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

18     B.     Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and  
19     abraded areas of shop paint are specified in Division 09 painting Sections.

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

22     END OF SECTION 055000



1 SECTION 055300 - METAL GRATINGS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Metal bar gratings.  
9 2. Metal frames and supports for gratings.

- 10 B. Related Sections:

- 11 1. Division 03 Section “Cast-In-Place Concrete” for installing anchor bolts and coordination  
12 of forming for gratings.

13 1.3 PERFORMANCE REQUIREMENTS

- 14 A. Structural Performance: Gratings shall withstand the effects of gravity loads and the following  
15 loads and stresses within limits and under conditions indicated.

- 16 1. Floors Subject to Traffic Loading: Uniform load of 250 lbf/sq. ft. (11.97 kN/sq. m) or  
17 concentrated load of 3000 lbf (13.40 kN), whichever produces the greater stress.  
18 2. Floors not Subject to Traffic Loading: Uniform load of 100 lbf/sq. ft. (4.79 kN/sq. m).  
19 3. Elevated Catwalks: Uniform load of 40 lbf/sq. ft (1.92 kN/sq. m).  
20 4. Sidewalks and Vehicular Driveways, Subject to Trucking: Uniform load of 250 lbf/sq. ft.  
21 (11.97 kN/sq. m) or concentrated load of 8000 lbf (35.60 kN), whichever produces the  
22 greater stress.  
23 5. Limit deflection to L/360 or 1/4 inch (6.4 mm), whichever is less.

- 24 B. Seismic Performance: Provide gratings and connections capable of withstanding the effects of  
25 earthquake motions determined according to ASCE/SEI 7, and meeting the requirements of the  
26 International Building Code as adopted by the agency having jurisdiction.

27 1.4 ACTION SUBMITTALS

- 28 A. Buy America: Certification that all steel components are provided in compliance with the Buy  
29 America requirements.

- 30 B. Product Data: For the following:

1 1. Formed-metal plank gratings.

2 C. Shop Drawings: Include plans, sections, details, and attachments to other work.

3 1.5 QUALITY ASSURANCE

4 A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual"  
5 and NAAMM MBG 532, "Heavy-Duty Metal Bar Grating Manual."

6 B. Welding Qualifications: Qualify procedures and personnel according to the following:

7 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

8 1.6 PROJECT CONDITIONS

9 A. Field Measurements: Verify actual locations of walls and other construction contiguous with  
10 gratings by field measurements before fabrication.

11 1.7 COORDINATION

12 A. Coordinate installation of anchorages for gratings, grating frames, and supports. Furnish setting  
13 drawings, templates, and directions for installing anchorages, including sleeves, concrete  
14 inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or  
15 masonry. Deliver such items to Project site in time for installation.

16 PART 2 - PRODUCTS

17 2.1 FERROUS METALS

18 A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of  
19 preconsumer recycled content not less than 25 percent.

20 B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

21 C. Steel Bars for Bar Gratings: ASTM A 36/A 36M or steel strip, ASTM A 1011/A 1011M or  
22 ASTM A 1018/A 1018M.

23 D. Wire Rod for Bar Grating Crossbars: ASTM A 510 (ASTM A 510M).

24 E. Galvanized-Steel Sheet: ASTM A 653/A 653M, structural quality, Grade 33 (Grade 230), with  
25 G90 (Z275) coating.

26 2.2 FASTENERS

27 A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use  
28 and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941

(ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

B. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts, and, where indicated, flat washers; ASTM F 593 (ASTM F 738M) for bolts and ASTM F 594 (ASTM F 836M) for nuts, Alloy Group 1 (A1).

C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

D. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).

E. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).

F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

## 2.3 MISCELLANEOUS MATERIALS

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

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.4 FABRICATION

A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.

D. Fit exposed connections accurately together to form hairline joints.

E. Welding: Comply with AWS recommendations and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.

2.5 METAL BAR GRATINGS

A. Welded Steel Grating: For use at all locations requiring bar gratings.

1. Grating Mark W-15-4 (1 x 1/8) STEEL: Provide minimum 1-by-1/8-inch (25-by-3.2-mm) bearing bars at 15/16 inch (24 mm) o.c., and crossbars at 4 inches (102 mm) o.c., unless indicated otherwise on the drawings. For gratings at shop buildings, see structural drawings for sizes. Bearing bar spacing shall be reduced as needed to comply with ADA requirements as necessary.
2. Traffic Surface: Plain.
3. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. (550 g/sq. m) of coated surface.
4. Provide edge banded grating at all locations unless noted otherwise on architectural and structural drawings.

B. Removable Grating Sections: Fabricate with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated or, if not indicated, as recommended by manufacturer for attaching to supports.

1. Provide no fewer than four weld lugs for each heavy-duty grating section, with each lug shop welded to two bearing bars.
2. Provide no fewer than four saddle clips for each grating section composed of rectangular bearing bars 3/16 inch (4.8 mm) or less in thickness and spaced 15/16 inch (24 mm) or more o.c., with each clip designed and fabricated to fit over two bearing bars.
3. Provide no fewer than four weld lugs for each grating section composed of rectangular bearing bars 3/16 inch (4.8 mm) or less in thickness and spaced less than 15/16 inch (24 mm) o.c., with each lug shop welded to three or more bearing bars. Interrupt intermediate bearing bars as necessary for fasteners securing grating to supports.
4. Furnish threaded bolts with nuts and washers for securing grating to supports.
5. Provide threaded holes at grate corners for installing removable eye bolts for grate lifting.

C. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.

1. Edge-band openings in grating that interrupt four or more bearing bars with bars of same size and material as bearing bars.

D. Do not notch bearing bars at supports to maintain elevation.

2.6 GRATING FRAMES AND SUPPORTS

- A. Frames and Supports for Metal Gratings: Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.

1. Unless otherwise indicated, fabricate from same basic metal as gratings.
2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches (600 mm) o.c. and provide minimum anchor units in the form of welded headed studs at concrete substrates (and expansion anchors at masonry substrates) 1/2 inches (13 mm) in diameter by 4 inches (100 mm) long.

- B. Galvanize steel frames and supports for all locations.

2.7 STEEL FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Finish gratings, frames, and supports after assembly.

- C. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing gratings to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, and other connectors.

- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.

- D. Fit exposed connections accurately together to form hairline joints.

3.2 INSTALLING METAL BAR GRATINGS

- A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.

1       B.     Attach removable units to supporting members with type and size of clips and fasteners  
2             indicated or, if not indicated, as recommended by grating manufacturer for type of installation  
3             conditions shown.

4       C.     Attach non-removable units to supporting members by welding where both materials are same;  
5             otherwise, fasten by bolting as indicated above.

6    3.3     ADJUSTING AND CLEANING

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

9    END OF SECTION 055300

1 SECTION 061000 - ROUGH CARPENTRY

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Wood blocking  
9 2. Exterior plywood wall sheathing  
10 3. Plywood backing panels.

- 11 B. Related Requirements:

- 12 1. Division 06 Section "Exterior Carpentry"  
13 2. Structural Drawing General Notes

14 1.3 DEFINITIONS

- 15 A. Exposed Framing: Framing not concealed by other construction.

- 16 B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5  
17 inches nominal (114 mm actual) in least dimension.

- 18 C. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.

- 19 D. Lumber grading agencies, and the abbreviations used to reference them, include the following:

- 20 1. NLGA: National Lumber Grades Authority.  
21 2. WCLIB: West Coast Lumber Inspection Bureau.  
22 3. WWPA: Western Wood Products Association.

23 1.4 ACTION SUBMITTALS

- 24 A. Product Data: For each type of process and factory-fabricated product. Indicate component  
25 materials and dimensions and include construction and application details.

- 26 1. Include data for wood-preservative treatment from chemical treatment manufacturer and  
27 certification by treating plant that treated materials comply with requirements. Indicate  
28 type of preservative used and net amount of preservative retained.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Shop Drawings: Show layout of trusses and full dimensions of each member. Include full data on design and materials. Include large-scale details of connections and all headers and their supports. See Structural Notes for additional requirements for shop drawings.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Delegated-Design Submittal: For wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Powder-actuated fasteners.
5. Expansion anchors.
6. Metal framing anchors.

#### 1.6 QUALITY ASSURANCE

A. Truss Manufacturer Qualifications: A truss manufacturer meeting the requirements of these specifications regularly engaged in the manufacturing of the specified products.

1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.



1.7 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.

- B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal (38-mm actual) thickness or less, no limit for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

- D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
  1. Use treatment that does not promote corrosion of metal fasteners.
  2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

## 2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction:
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber and any of the following species:
  - a. Hem-fir; WCLIB, or WWPA.
  - b. Douglas fir-larch; WCLIB or WWPA.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
  - a. Hem-fir; WCLIB, or WWPA.
  - b. Douglas fir-larch; WCLIB or WWPA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.5 PLYWOOD WALL SHEATHING

A. Plywood Wall Sheathing: See General Structural Notes on Structural Drawings

1. Oriented Strand Board: Not allowed

## 2.6 PLYWOOD BACKING PANELS

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

## 2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.8 METAL FRAMING ANCHORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Phoenix Metal Products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.
6. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

D. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

1. Use for interior locations unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

D. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

- G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

- H. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

- I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

- J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

- K. Plywood Wall Sheathing: See Structural General Notes.

### 3.2 WOOD BLOCKING INSTALLATION

- A. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

- B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

### 3.3 REPAIRS AND PROTECTION

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

- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

- C. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

- 1 D. Protective Coating: Clean and prepare exposed surfaces of metal connector plates. Brush apply
- 2 primer, when part of coating system, and one coat of protective coating.
- 3 1. Apply materials to provide minimum dry film thickness recommended by coating system
- 4 manufacturer.
- 5 END OF SECTION 061000

1 SECTION 062013 - EXTERIOR FINISH CARPENTRY

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Reclaimed lumber for exterior tongue & groove wood siding.  
9 2. Furring strips and accessories.

10 B. Related Requirements:

- 11 1. Division 05 Section "Cold-Formed Metal Framing" for blocking in exterior metal stud  
12 walls to provide backing for siding specified in this section.  
13 2. Division 06 Section "Rough Carpentry" for furring, blocking, plywood sheathing and  
14 other carpentry work not exposed to view.  
15 3. Division 07 Section "Weather Barriers" for waterproof underlayment to be installed  
16 under wood furring and wood siding specified under this section, and for drainage mat  
17 material to be installed as a part of the rain screen system.  
18 4. Division 09 Section "Staining and Transparent Finishing" for preparation and finishing  
19 with stains and transparent finishes.

20 1.3 SUBMITTALS

- 21 A. Certification: Provide letter certifying source of reclaimed lumber.

22 B. Fabrication Samples:

- 23 1. Provide milled samples of reclaimed lumber.

24 1.4 QUALITY ASSURANCE

- 25 A. Installer Qualifications: Installer shall be regularly engaged in installation of the systems  
26 specified, thoroughly familiar with materials and techniques, employing skilled workmen, and  
27 shall have not less than 5 years experience in installation of finish carpentry systems of a similar  
28 nature.

- 29 B. Mockups: Build mockups to verify selections made under sample submittals and to  
30 demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of rain-screen system. Mockup shall use all of the specified materials and finishes, and shall demonstrate all joint systems specified or detailed. Include all corner transitions.
2. Mockup shall be at least 4 foot by 4 foot.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Preinstallation Conference: Conduct conference at Project site.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

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

#### 1.6 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### PART 2 - PRODUCTS

#### 2.1 RECLAIMED LUMBER

- A. Material: Reclaimed Western Red Cedar in the following sizes.:
1. Wood Siding Boards: 3/4" wide by x 3-1/2" exposed face, tongue and groove, or as otherwise indicated on Drawings.
  2. Wood Trim Materials: Dimensions as indicated on Drawings.
- B. Locations: Reclaimed wood to be used at all locations noted for the following:
- C. Source: Obtain reclaimed wood material from a source specializing in reclaimed wood material.
- D. Quality and Appearance: All reclaimed wood material shall be dimensionally stable, clear VG, milled to achieve dimensions specified, with a finished appearance satisfactory to the Architect.



2.2 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with the wood siding system indicated on the drawings.
- B. Aluminum Wire Fabric: 18-by-16 (1.1-by-1.3-mm) mesh of 0.011-inch- (0.28-mm-) diameter, coated aluminum wire.
  - 1. Wire-Fabric Finish: As selected by the Architect from the manufacturer's full range of available colors.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
  - 1. For exterior siding, provide stainless-steel mechanical fasteners blind nailed as indicated on the drawings.
- B. Flashing: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.
- C. Furring Strips: For use with wood siding.
  - 1. 3/4" x 3/4" pressure-treated wood furring strips as indicated on Drawings.
  - 2. Option: Cementitious fiberboard strips

2.4 FABRICATION

- A. Back out or kerf backs of standing and running trim wider than 5 inches (125 mm), except members with ends exposed in finished work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

- 1 B. Wood Siding: Before proceeding with installation, confirm that waterproof underlayment has  
2 been fully installed, and has been inspected by the Owner's envelope inspector, and all required  
3 repairs have been made.

4 3.3 INSTALLATION, GENERAL

- 5 A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately  
6 seasoned, or too small to fabricate with proper jointing arrangements.

- 7 1. Do not use units with defective surfaces, sizes, or patterns.

- 8 B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use  
9 concealed shims where necessary for alignment.

- 10 1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as  
11 recommended by manufacturer.

- 12 2. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb.  
13 Install adjoining exterior finish carpentry with 1/32-inch (0.8-mm) maximum offset for  
14 flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.

- 15 3. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.  
16 Provide cutouts for mechanical and electrical items that penetrate exterior finish  
17 carpentry.

- 18 C. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting  
19 joints with full-surface contact throughout length of joint. Plane backs of casings to provide  
20 uniform thickness across joints, where necessary for alignment.

- 21 D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless  
22 otherwise indicated.

23 3.4 WOOD SIDING INSTALLATION

- 24 A. Furring Strips: Mechanically fasten furring strips vertically as indicated on the drawings, and  
25 horizontally where shown, over the waterproof underlayment. Fasten through waterproof  
26 underlayment into metal studs or metal backing. Coordinate with Division 5 Section "Cold-  
27 Formed Metal Framing" to assure backing is properly installed in required locations. Run  
28 furring continuously from top of wall to bottom of wall, as indicated on the drawings.

- 29 B. Insect Screen: Stretch in place to provide smooth, continuous barrier to prevent insects from  
30 entering the rain screen void. Mechanically fasten at each furring strip as indicated on the  
31 Drawings. Do not allow fasteners to penetrate more than the thickness of the furring strips.  
32 Coordinate with installation of drainage mat and waterproof underlayment specified in Division  
33 7 Section "Weather Barriers".

- 34 C. Tongue and Groove Wood Siding: Mechanically fasten, blind nailed, at each wood board  
35 directionally as indicated on the Drawings.

- 36 1. Butt joints only over furring strips, fastening top and bottom on each side and staggering  
37 joints in subsequent courses, unless indicated otherwise on the drawings.

1            2.    Install in random lengths, minimizing joints.

2    3.5    ADJUSTING

3        A.    Replace exterior finish carpentry that is damaged or does not comply with requirements.  
4            Exterior finish carpentry may be repaired or refinished if work complies with requirements and  
5            shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

6    3.6    CLEANING

7        A.    Clean exterior finish carpentry on exposed and semi-exposed surfaces. Touch up factory-  
8            applied finishes to restore damaged or soiled areas.

9    3.7    PROTECTION

10       A.    Protect installed products from damage from weather and other causes during construction.

11       B.    Remove and replace finish carpentry materials that are wet, moisture damaged, and mold  
12            damaged.

13           1.    Indications that materials are wet or moisture damaged include, but are not limited to,  
14            discoloration, sagging, or irregular shape.

15           2.    Indications that materials are mold damaged include, but are not limited to, fuzzy or  
16            splotchy surface contamination and discoloration.

17    END OF SECTION 062013



1 SECTION 062023 - INTERIOR FINISH CARPENTRY

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Interior reclaimed wood stripping at custom casework.  
9 2. Wood panel material for interior wainscot.  
10 3. Wood fiberboard material for interior base

11 B. Related Requirements:

- 12 1. Division 06 Section "Rough Carpentry" for furring, blocking, and other carpentry work  
13 not exposed to view.  
14 2. Division 09 Section "Interior Painting" for priming and back-priming of interior finish  
15 carpentry.  
16 3. Division 09 Section "Staining and Transparent Finishing" for preparation and finishing  
17 with stains and transparent finishes.

18 1.3 DEFINITIONS

- 19 A. MDF: Medium-density fiberboard.

- 20 B. MDO: Plywood with a medium-density overlay on the face.

21 1.4 ACTION SUBMITTALS

- 22 A. Product Data: For each type of process and factory-fabricated product. Indicate component  
23 materials, dimensions, profiles, textures, and colors and include construction and application  
24 details.

25 B. Samples for Verification:

- 26 1. For each species and cut of lumber and panel products with non-factory-applied finish,  
27 with 1/2 of exposed surface finished, 50 sq. in. (300 sq. cm) for lumber and 8 by 10  
28 inches (200 by 250 mm) for panels.  
29 2. For all products specified for each wainscoting system, including all specified and  
30 scheduled colors and finish, fasteners, trim and other products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer shall be regularly engaged in installation of the systems specified, thoroughly familiar with materials and techniques, employing skilled workmen, provide proof of at least 10 similar installations in good condition, and shall have not less than 5 years experience in installation of finish carpentry systems.
- B. Source Limitations: Obtain products of each type and species from one source or producer.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup of each type of wainscoting system. Mockup shall be the full height of the wainscot and shall be at least 8 feet wide, shall use all of the specified materials and finishes, and shall demonstrate all joint systems specified or detailed.
  - 2. Build mockup of wood stripping wall system. Mockup shall be at least 4 foot by 4 foot and include corner detailing and edge finishing.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
  - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, BASE

- A. MDF: ANSI A208.2, Grade 130, made with binder containing no urea-formaldehyde resin.

2.2 PANEL WAINSCOT

- A. Panel Wainscot, Type 1: Scheduled on drawings as “MDFW” (Medium-Density Fiberboard Wainscot) or ‘MDF’. Medium-Density Fiberboard, ANSI A208.2, Grade MD-Exterior Glue. 4 foot by 8 foot panels, unless noted otherwise on drawings.”

1. Panel Size Pattern: Pattern and size as indicated on drawings. 1/2 inch panel thickness, unless indicated otherwise on drawings.
2. Finish: As specified in Division 9 Section “Interior Painting” and/or “Staining and Transparent Finishing”, shop applied.
4. Attachment: Glue, VOCs complying with South Coast Air Quality Management District Rule 1168, and self-tapping, stainless steel screws with decorative stainless steel washers, unless indicated otherwise on the drawings.
5. Aluminum Trim: Provide clear anodized or mill finish aluminum extrusions, in custom sizes and shapes as shown on the drawings.

- B. Panel Wainscot at rooms other than storage rooms: Scheduled on drawings as “PWW” (Plywood Wainscot).

1. Locations: At rooms indicated on drawings called out as “Panel Wainscot” or “Plywood Wainscot” or similar words, installed over Gypsum Wall Board.
2. Panel Size Pattern: Pattern and size as indicated on drawings.
3. Panel Type: Hardwood Veneer Plywood complying with HPVA HP-1, made without urea-formaldehyde adhesive.

- a. Face Veneer Species and Cut: Same species as specified herein for hardwood trim.
- b. Veneer Matching: Selected for similar color and grain.
- c. Backing Veneer Species: Any hardwood compatible with face species.
- d. Construction: Veneer core.
- e. Thickness: 7/16 inch (11 mm).
- f. Panel Size: 48 by 96 inches (1219 by 2438 mm, unless indicated otherwise on the drawings.
- g. Options in "Panel Size" Subparagraph below are true metric sizes; verify availability before specifying. Panel width must be coordinated with stud spacing and will affect groove spacing.
- h. Glue Bond: Type I (exterior).
- i. Face Pattern: Smooth.

4. Finish: As specified in Division 09 Section “Staining and Transparent Finishing”, shop applied.
5. Attachment: Self-tapping, stainless steel screws with decorative stainless steel washers, as indicated on the Drawings.

- C. Panel Type 2: Scheduled on drawings as “MDO”, Medium Density Overlay.

- 1 1. Attach directly to framing as indicated on Drawings.
- 2 2. Exterior Grade BB
- 3 3. APA labeled
- 4 4. Sizes as indicated on Drawings.

5 2.3 RECLAIMED LUMBER

6 A. Material: Reclaimed Western Red Cedar noted as "Wood Stripping":

- 7
- 8 1. 3/4" wide by x 3-1/2" exposed face, tongue and groove, or as otherwise indicated on
  - 9 Drawings.

10 B. Locations: Reclaimed wood stripping at Vestibule, Lobby reception desk and kitchen island.

11 To match exterior wood siding.

12 C. Source: Obtain reclaimed wood material from a single source specializing in reclaimed wood

13 material.

14 D. Quality and Appearance: All reclaimed wood material shall be dimensionally stable, clear VG ,

15 milled to achieve dimensions specified, with a finished appearance satisfactory to the Architect.

16 2.4 MISCELLANEOUS MATERIALS

17 A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type,

18 size, material, and finish required for application indicated to provide secure attachment,

19 concealed where possible.

- 20 1. Fasteners for Wood Stripping: stainless-steel mechanical fasteners blind nailed as
- 21 indicated on the drawings.

22 B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer

23 for general carpentry use.

- 24 1. Wood glue shall have a VOC content of 30 g/L or less when calculated according to
- 25 40 CFR 59, Subpart D (EPA Method 24).

26 C. Wainscot Adhesive: Comply with wainscot manufacturer's written recommendations for

27 adhesives.

- 28 1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to
- 29 40 CFR 59, Subpart D (EPA Method 24).

30 D. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is

31 recommended for indicated use by adhesive manufacturer.

- 32 1. Adhesive shall have a VOC content of 70 g/L or less when calculated according to
- 33 40 CFR 59, Subpart D (EPA Method 24).

34 E. Wainscot Trim:



- 1           1.     Eagle Moldings A-1424
- 2           2.     Size: 1/2" x 1" x 1/8"
- 3           3.     Color: Black anodized.

#### 4     PART 3 - EXECUTION

##### 5     3.1     EXAMINATION

- 6       A.     Examine substrates, with Installer present, for compliance with requirements for installation
- 7             tolerances and other conditions affecting performance.
- 8       B.     Examine finish carpentry materials before installation. Reject materials that are wet, moisture
- 9             damaged, and mold damaged.
- 10      C.     Proceed with installation only after unsatisfactory conditions have been corrected.

##### 11    3.2     PREPARATION

- 12      A.     Clean substrates of projections and substances detrimental to application.
- 13      B.     Before installing interior finish carpentry, condition materials to average prevailing humidity in
- 14             installation areas for a minimum of 24 hours unless longer conditioning is recommended by
- 15             manufacturer.

##### 16    3.3     INSTALLATION, GENERAL

- 17      A.     Do not use materials that are unsound, warped, improperly treated or finished, inadequately
- 18             seasoned, too small to fabricate with proper jointing arrangements, or with defective surfaces,
- 19             sizes, or patterns.
- 20      B.     Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use
- 21             concealed shims where necessary for alignment.
- 22           1.     Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as
- 23                 recommended by manufacturer.
- 24           2.     Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand
- 25                 unless otherwise indicated.
- 26           3.     Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb.
- 27                 Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for
- 28                 flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
- 29           4.     Coordinate interior finish carpentry with materials and systems in or adjacent to it.
- 30                 Provide cutouts for mechanical and electrical items that penetrate interior finish
- 31                 carpentry.

##### 32    3.6     WAINSCOTING

- 33      A.     Locations: Where shown on Drawings as Wainscoting.

B. Layout: Layout in pattern and sizes shown on drawings. Where nothing is shown, but room is noted or scheduled to have wainscoting, arrange panels on each wall for even balance, with equal panel widths at each end. Confirm layout with Architect.

C. Wainscot Panels – "MDO":

1. Install with long edges as shown on drawings, applied over gypsum wall board over steel stud wall framing members with edges occurring at stud bearing points or over blocking; install in full-length panels full height of wainscot, unless shown otherwise on drawings.
2. Install with 1/16-inch gap at joints between panels, unless detailed otherwise.
3. Bevel edges of panels 1/4 inches unless indicated otherwise on drawings.
4. Adhere panels to gypsum board as recommended by the wainscot manufacturer, and mechanically fasten panels in place with self-tapping screws with decorative washers into metal studs or metal backing. Coordinate studs and backing with Division 5 and 9 sections. Install in pattern as shown on drawings, or if none is shown, install at panel corners 6 inches in each way, and at panel center 6 inches in from edge, 6 fasteners per 4 by 8 foot panel.
5. Hold panels 1/4 inch above floor to avoid water wicking onto panels during construction. Cut panels if required to provide this gap and to align with adjoining materials as indicated on the drawings to comply with the design intent.

D. Wainscot Panels – "PWW":

1. Install with long edges as shown on drawings, applied over gypsum wall board over steel stud wall framing members with edges occurring at stud bearing points; install in full-length panels full height of wainscot, unless shown otherwise on drawings.
2. Install with 1/16-inch gap at joints between panels, unless detailed otherwise.
3. Bevel edges of panels 1/4 inch unless indicated otherwise on drawings.
4. Screw panels in place with self-tapping screws with decorative washers into metal studs or metal backing. Coordinate studs and backing with Division 5 and 9 sections. Install in pattern as shown on drawings.

E. Back Priming

1. Fully prime the back side surface of all MDO Panels.

### 3.4 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

### 3.5 CLEANING

A. Clean interior finish carpentry on exposed and semi-exposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes, if any.

1 3.6 PROTECTION

2 A. Protect installed products from damage from weather and other causes during construction.

3 B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold  
4 damaged.

5 1. Indications that materials are wet or moisture damaged include, but are not limited to,  
6 discoloration, sagging, or irregular shape.

7 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or  
8 splotchy surface contamination and discoloration.

9 END OF SECTION 062023



1 SECTION 071113 - BITUMINOUS DAMPPROOFING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Cold-applied, emulsified-asphalt dampproofing.  
9 2. Applications include, but are not limited to the following surfaces:  
10 a. Exterior, below-grade surfaces of concrete foundation walls, turn-down slab edges,  
11 and associated footings.

12 B. Related Requirements:

- 13 1. Division 07 Section "Self-adhering Sheet Waterproofing" for waterproofing at below  
14 grade retaining walls and pits.

15 1.3 ACTION SUBMITTALS

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

17 1.4 FIELD CONDITIONS

- 18 A. Weather Limitations: Proceed with application only when existing and forecasted weather  
19 conditions permit dampproofing to be performed according to manufacturers' written  
20 instructions.

- 21 B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed  
22 spaces. Maintain ventilation until dampproofing has cured.

23 PART 2 - PRODUCTS

24 2.1 MATERIALS, GENERAL

- 25 A. Source Limitations: Obtain primary dampproofing materials and primers from single source  
26 from single manufacturer. Provide auxiliary materials recommended in writing by  
27 manufacturer of primary materials.

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Karnak Corporation; Number 220AF.
2. Sonneborn: Hydrocice 700B.
3. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

B. Trowel Coats: ASTM D 1227, Type II, Class 1.

C. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.

D. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

C. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

D. Patching Compound: Asbestos-free fibered mastic of type recommended in writing by dampproofing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous dampproofing work.

1. Test for surface moisture according to ASTM D 4263.

B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

1 B. Clean substrates of projections and substances detrimental to the dampproofing work; fill voids,  
2 seal joints, and remove bond breakers if any, as recommended in writing by prime material  
3 manufacturer.

4 C. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other  
5 imperfections; cover with asphalt-coated glass fabric.

6 3.3 APPLICATION, GENERAL

7 A. Comply with manufacturer's written instructions for dampproofing application, cure time  
8 between coats, and drying time before backfilling unless more stringent requirements are  
9 indicated.

- 10 1. Apply dampproofing to provide continuous plane of protection.  
11 2. Apply additional coats if recommended in writing by manufacturer or to achieve a  
12 smooth surface and uninterrupted coverage.

13 B. Where dampproofing footings, turn-down slab edges and foundation walls, apply from finished-  
14 grade line to top of footing; extend over top of footing and down a minimum of 6 inches (150  
15 mm) over outside face of footing.

- 16 1. Extend dampproofing 12 inches (300 mm) onto intersecting walls and footings, but do  
17 not extend onto surfaces exposed to view when Project is completed.  
18 2. Install flashings and corner protection stripping at internal and external corners, changes  
19 in plane, construction joints, cracks, and where shown as "reinforced," by embedding an  
20 8-inch- (200-mm-) wide strip of asphalt-coated glass fabric in a heavy coat of  
21 dampproofing. Dampproofing coat for embedding fabric is in addition to other coats  
22 required.

23 C. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap  
24 dampproofing at least 1 inch onto flashing, masonry reinforcement, veneer ties, and other items  
25 that penetrate inner wythe, unless detailed otherwise.

- 26 1. Extend dampproofing over outer face of structural members and concrete slabs that  
27 interrupt inner wythe.  
28 2. Lap dampproofing at least 1 inch onto shelf angles supporting veneer.  
29 3. Wrap into masonry openings as detailed.

30 D. Where dampproofing earth face of retaining walls, lap dampproofing at least 1 inch onto  
31 flashing (if any), unless detailed otherwise.

32 3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

33 A. Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft.  
34 (0.6 L/sq. m) for first coat and 1 gal./100 sq. ft. (0.4 L/sq. m) for second coat or one trowel coat  
35 at not less than 4 gal./100 sq. ft. (1.6 L/sq. m).

- 1    3.5        CLEANING
- 2        A.    Clean spillage and soiling from adjacent construction using cleaning agents and procedures
- 3                recommended in writing by manufacturer of affected construction.
- 4    END OF SECTION 071113



1 SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General and Supplementary  
5 Conditions and Division 01 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Modified bituminous sheet waterproofing, for application at foundation walls at vehicle  
9 lift pit.

- 10 B. Related Requirements:

- 11 1. Division 3 Section “Cast-in-Place Concrete” for coordination with concrete foundation.

12 1.3 PREINSTALLATION MEETINGS

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

- 14 1. Review waterproofing requirements including surface preparation, substrate condition  
15 and pretreatment, minimum curing period, forecasted weather conditions, special details  
16 and sheet flashings, installation procedures, testing and inspection procedures, and  
17 protection and repairs.

18 1.4 ACTION SUBMITTALS

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

- 20 1. Include construction details, material descriptions, and tested physical and performance  
21 properties of waterproofing.  
22 2. Include manufacturer's written instructions for evaluating, preparing, and treating  
23 substrate.

- 24 B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and  
25 cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining  
26 waterproofing, and other termination conditions.

- 27 C. Samples: For each exposed product and for each color and texture specified, including the  
28 following products:

- 29 1. 8-by-8-inch (200-by-200-mm) square of waterproofing and flashing sheet.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for installation.
  - 1. Build for each typical waterproofing installation including accessories to demonstrate surface preparation, crack and joint treatment, corner treatment, and protection.
    - a. Size: 50 sq. ft. in area.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
  - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials, protection course, and molded-sheet drainage panels from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Minimum 60-mil (1.5-mm) nominal thickness, self-adhering sheet consisting of 56 mils (1.4 mm) of rubberized asphalt laminated on one side to a 4-mil- (0.10-mm-) thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Carlisle Coatings & Waterproofing Inc; CCW MiraDRI 860/861.
- b. Henry Company; Blueskin WP 200.
- c. Or equivalent from an approved manufacturer per Specification Sections 002113 and 012500.

2. Physical Properties:

- a. Tensile Strength, Membrane: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
- b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
- c. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970.
- d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch (3-mm) movement; ASTM C 836.
- e. Puncture Resistance: 40 lbf (180 N) minimum; ASTM E 154.
- f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.
- g. Water Vapor Permeance: 0.05 perms (2.9 ng/Pa x s x sq. m) maximum; ASTM E 96/E 96M, Water Method.
- h. Hydrostatic-Head Resistance: 200 feet (60 m) minimum; ASTM D 5385.

3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

- B. Primer: Liquid waterborne primer recommended for substrate by sheet-waterproofing material manufacturer.
- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

#### 2.4 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate of 9 to 15 gpm per ft. (112 to 188 L/min. per m).
- 1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Carlisle Coatings & Waterproofing Inc; CCW MiraDRAIN 6000.
  - b. Or equivalent from an approved manufacturer per Specification Sections 002113 and 012500.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the waterproofing.
  - 1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
  - 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

- 1 C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other  
2 penetrating contaminants or film-forming coatings from concrete.
- 3 D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets,  
4 holes, and other voids.
- 5 E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints  
6 and cracks according to ASTM D 4258.
- 7 F. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
  - 8 1. Install membrane strips centered over vertical inside corners. Install 3/4-inch (19-mm)  
9 fillets of liquid membrane on horizontal inside corners and as follows:
    - 10 a. At footing-to-wall intersections, extend liquid membrane in each direction from  
11 corner or install membrane strip centered over corner.
- 12 G. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through  
13 waterproofing and at drains and protrusions according to ASTM D 6135.

### 14 3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

- 15 A. Install modified bituminous sheets according to waterproofing manufacturer's written  
16 instructions and recommendations in ASTM D 6135.
- 17 B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will  
18 be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- 19 C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and  
20 maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal  
21 seams, and stagger end laps to ensure watertight installation.
  - 22 1. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and  
23 plus 5 deg C), install self-adhering, modified bituminous sheets produced for low-  
24 temperature application. Do not use low-temperature sheets if ambient or substrate  
25 temperature is higher than 60 deg F (16 deg C).
- 26 D. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks,  
27 construction, and contraction joints.
- 28 E. Seal edges of sheet-waterproofing terminations with mastic.
- 29 F. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit  
30 and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches (150  
31 mm) beyond repaired areas in all directions.
- 32 G. Immediately install protection course with butted joints over waterproofing membrane.
  - 33 1. Molded-sheet drainage panels may be used in place of a separate protection course to  
34 vertical applications when approved by waterproofing manufacturer and installed  
35 immediately.

3.4 MOLDED-SHEET DRAINAGE-PANEL INSTALLATION

- A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesives or other methods that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.5 FIELD QUALITY CONTROL

- A. Owner may engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish daily reports to Architect.
- B. Prepare test and inspection reports.

3.6 PROTECTION, REPAIR, AND CLEANING

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071326

1 SECTION 072100 - THERMAL INSULATION

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:
- 8 1. Spray Foam Insulation
  - 9 2. Glass-fiber blanket insulation.
  - 10 3. Vapor retarders for wall systems.
  - 11 4. Sound attenuation insulation.
- 12 B. Related Sections:
- 13 1. Division 05 and 09 Sections for installation in metal-framed assemblies of insulation  
14 specified by referencing this Section.
  - 15 2. Division 07 Section "Metal Wall Panels" for horizontal and vertical metal siding panels  
16 installed over batt insulation as part of the metal building system envelope.
  - 17 3. Division 13 Section "Metal Building Systems" for roof insulation and vapor retarders, and  
18 rigid foam plastic wall insulation systems installed as part of metal building system  
19 envelope.
  - 20 4. Division 23 sections for duct and pipe insulation.

21 1.3 ACTION SUBMITTALS

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

23 1.4 INFORMATIONAL SUBMITTALS

- 24 A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified  
25 testing agency, for each product.
- 26 B. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES.

27 1.5 QUALITY ASSURANCE

- 28 A. Surface-Burning Characteristics: As determined by testing identical products according to  
29 ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of  
30 applicable testing agency.

- 1 B. Source Limitation: Obtain each type of building insulation through one source from a single  
2 manufacturer.

3 1.6 DELIVERY, STORAGE, AND HANDLING

- 4 A. Protect insulation materials from physical damage and from deterioration due to moisture,  
5 soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's  
6 written instructions for handling, storing, and protecting during installation.

- 7 B. Protect foam-plastic board insulation as follows:

- 8 1. Do not expose to sunlight except to necessary extent for period of installation and  
9 concealment.  
10 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to  
11 Project site before installation time.  
12 3. Quickly complete installation and concealment of foam-plastic board insulation in each  
13 area of construction.

14 PART 2 - PRODUCTS

15 2.1 GLASS-FIBER BLANKET INSULATION

- 16 A. Manufacturers: Subject to compliance with requirements, provide products by one of the  
17 following:

- 18 1. CertainTeed Corporation.  
19 2. Guardian Building Products, Inc.  
20 3. Johns Manville.  
21 4. Knauf Insulation.  
22 5. Owens Corning.  
23 6. Or approved substitute during the bid process per the Instructions to Bidders and  
24 Specification Section 012500.

- 25 B. Recycled Content (Voluntary Goal): Postconsumer recycled content plus one-half of  
26 preconsumer recycled content not less than 20 percent.

- 27 C. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread  
28 and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing  
29 ASTM E 136 for combustion characteristics.

- 30 1. Mineral-Fiber Type: Provide as specified in this paragraph, except provide from slag or  
31 rock wool where required by code.  
32 2. Thickness and R-Value:  
33 a. Exterior Wall Layer: Provide 4 inch blankets compressed behind metal wall  
34 panels for minimum R-13.  
35 b. Within Girts: Provide 8 inch blankets within girt framing for minimum R-25.  
36 c. Other Thicknesses: As indicated on Drawings. May require two or more layers.



D. Unfaced Mineral Fiber Blanket/Batt Sound Insulation: Sound insulation produced by combining mineral fibers of type described below – with thermosetting resins to comply with ASTM C665 for Type I blankets without membrane facing; and as follows:

1. Mineral Fiber Type: Fibers manufacturer from glass.
2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50 respectively.
3. Sizes: Widths as required to fit stud or joist spacing as indicated on drawings. Thickness shall be as follows:

- a. 3 ½ inch thick for 3 ½ and 4 inch stud walls, and where indicated.
- b. 6 inch thick for 6 inch and larger stud walls, and where indicated.

4. Furnish same insulation cut in strips for filling space between wall studs and door and reight frames in all sound –retardant wall, whether shown on drawings or not.
5. Furnish sound attenuation fire blankets in rated assemblies as required to meet specific assemblies listed.

E. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:

1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

## 2.2 SPRAY-FOAM INSULATION

A. Type: Injection foam, closed-cell, polyurethane insulation, with non-Chlorofluorocarbon (Non-CFC) blowing agent.

B. Manufacturers: FOAM-TECH “SUPERGREEN FOAM”, a division of Building Envelope Solutions, Inc, 802-333-4333, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

1. No added urea-formaldehyde.

C. Location: Optional in lieu of batt insulation for miscellaneous cavities to provide complete insulation coverage.

D. Thermal Performance:

1. R-Value: Minimum R-6 per inch.

## 2.3 VAPOR RETARDERS

A. Reinforced-Polyethylene Vapor Retarders: Two outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not

less than 25 lb/1000 sq. ft. (12 kg/100 sq. m), with maximum permeance rating of 0.0507 perm (2.9 ng/Pa x s x sq. m).

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Raven Industries Inc.; DURA-SKRIM 6WW.
- b. Reef Industries, Inc.; Griffolyn T-65.
- c. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

2. Locations for Use: For general use at all locations requiring a vapor retarder (barrier), except where other types of vapor retarders are specified herein or where another type is required to meet code.

B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

D. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

E. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

F. Fasteners and Other Insulation Retainage Systems: Provide as indicated on the drawings, or as otherwise required to provide a complete and proper insulation system, and as recommended by the insulation manufacturer for the application of each insulation type.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

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

#### 3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Comply with Washington State Non-Residential Energy Code for Building Envelope Sealing.

C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

D. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

- E. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

### 3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

- B. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
5. Install metal wall panels in conjunction with wall batt insulation at locations indicated on drawings, compressing insulation while maintaining full coverage of insulation within wall system.

- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.
3. Fill all voids in exterior envelope framing with mineral-fiber insulation or spray foam insulation (which meets requirements of agency having jurisdiction), including stud wall headers, jamb stud cavities, and like spaces.

### 3.4 INSTALLATION OF SPRAY-FOAM INSULATION

- A. Install spray-foam insulation complying with manufacturer's written instructions. Install at all locations shown on drawings and all location in exterior envelope where primary envelope insulation system does not fill all voids and gaps, including but not limited to jambs and heads at wall openings, exterior side of wide flange beams, etc. Install in lieu of other types of insulation materials if the construction schedule does not allow for the prevention of water or moisture damage of the originally specified insulation material.

3.5 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

- A. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches (1219 mm) up either side of partitions.

3.6 INSTALLATION OF VAPOR RETARDERS

- A. Vapor barrier shall be applied to the warm side of all mineral-fiber insulation at the exterior building envelope. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation and spray foam insulation.

- B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.

1. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
2. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

- C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

- D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.7 PROTECTION

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

END OF SECTION 072100

1 SECTION 072500 - WEATHER BARRIERS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes: The following items and their related accessories.

- 8 1. Weather Resistive Barrier (WRB) Building Wrap.  
9 2. Waterproof Underlayment (AKA waterproof membrane).  
10 3. Flexible Flashing (various products).  
11 4. Drainage Mat (at rain screen system).

- 12 B. Related Requirements:

- 13 1. Division 06 Section "Sheathing" for sheathing joint and penetration treatment.  
14 2. Division 06 Section "Exterior Finish Carpentry" for coordination of weather barrier  
15 products with siding and furring installation.  
16 3. Division 07 Section "Thermal Insulation" for insulation systems adjacent to and  
17 continuous with areas receiving weather barrier components.  
18 4. Division 08 Sections for coordination of flexible flashing, waterproof underlayment and  
19 building wrap with openings in exterior walls.

20 1.3 ACTION SUBMITTALS

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

- 22 1. For building wrap, include data on air and water-vapor permeance based on testing  
23 according to referenced standards, and substantiating compliance with building code in  
24 effect for Project.

- 25 B. Provide proof of compatibility between flexible flashing products and sealants and between  
26 building wrap and other products.

- 27 C. Shop Drawings:

- 28 1. Provide full shop drawings (drawings and large scale details) illustrating the installation  
29 requirements and the relationship between the building wrap and associates materials,  
30 such as waterproof underlayment and flashing, liquid flashing, framing and blocking,  
31 insulation, sheathing, exterior wall finish systems, wall openings (windows, doors,  
32 louvers, etc.), flashings, wall penetrations, etc.

D. Samples:

1. Building Wrap: Three 8-1/2 x 11 inch samples of sheet, samples of tapes, wall opening specialties, and fasteners.
2. Flexible Flashing, Waterproof Underlayment and Drainage Mat: Three 8-1/2 x 11 inch samples of each sheet, of each type of underlayment and flashing specified.

E. Installation Instructions: Provide manufacturer's printed installation instruction for each product specified in this Section.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive and weather-resistive barrier and flexible flashing, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain all materials for each product type from one source or producer.
- B. Mockups: Build mockup of wall assembly including each wall component specified in this section to illustrate specified installation procedures, requirements, and quality of workmanship. Mock-ups shall remain available for review throughout construction period.
1. Provide jamb to sill, jamb to wall, and jamb to head for opening conditions.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, or other causes. Stack sheathing flat on leveled supports off the ground, under cover, and fully protected from weather.
- B. Store rolls of building wrap and waterproof underlayment under cover, on a clean, level surface, either flat or upright.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE / WEATHER-RESISTIVE BARRIER (BUILDING WRAP)

- A. Building Wrap (AKA Weather-Resistant or Water or Weather Resistant Barrier): Primary self-adhered water-resistive vapor permeable air barrier membrane components and accessories must be obtained as a single-source to ensure total system compatibility and integrity. Meeting ASTM E 2357 for air barrier assemblies; with flame-spread and smoke-developed indexes of less than 10 and 15, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Manufacturer/Product: VaproShield Inc. (866-731-7663) [www.VaproShield.com](http://www.VaproShield.com) “WrapShield SA®”, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
  2. Material: Multiple Layers of UV Stabilized, Spun Bonded Polypropylene underlayment, in 59 inch rolls.
  3. Standards:
    - a. Thickness and Weight: 0.026 inch / 8.26 oz./sq.yd.
    - b. Water Vapor Transmission: 212 perms per ASTM E 96-00, Method B (as tested by CNRC) 50 perms.
    - c. Water Penetration Resistance: per ATTCC-127, 550 mm hydrostatic head for 5 hours: No leakage.
  4. Accessories / Auxiliary Materials and Products: Provide underlayment flashing rolls, factory formed corners, small penetration flashing, single-sided taped, double-sided tape, and corrosion resistant fasteners of size and type as recommended by the weather-resistant barrier manufacturer for the substrate and structure specified for this project.
  5. Locations of Use: At all metal siding panels over metal stud metal furring and gypsum sheathing wall assemblies, and other locations where indicated.
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

## 2.2 FLUID APPLIED VAPOR BARRIER

- A. Vapor Barrier: Fluid-applied air and water resistive barrier to stop air and water leakage in veneer walls.
1. Manufacturer/ Product: Prosoco, ([www.prosoco.com](http://www.prosoco.com)) R-Guard VB, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
  2. Material: Liquid, which upon application, dries into a durable, rubberized, water-resistant membrane.
  3. Standards:
    - a. Air Leakage of Air Barrier Assemblies: ASTM E 2357.
    - b. Aging / Water Penetration Resistance: ICC-ES AC 212; AATCC 127.
    - c. Water Vapor Transmission: ASTM E 96.
    - d. Air Barrier: ASTM E 2178.
    - e. Adhesion to Substrates: ASTM D 4541 (ASTM C-297 modified).

## 2.3 MISCELLANEOUS FLASHING MATERIALS

- A. Flashing Membrane:–Liquid flashing, producing a seamless, elastomeric flashing membrane.
1. Locations: For use in conjunction with building wrap at all wall openings, such as doors, windows, storefront, curtain wall, louvers, other penetrations, and as detailed.

2. Manufacturers / Products: Prosoco, Inc. 3741 Greenway Circle, Lawrence, KS 66046; Phone: (800) 255-4255; [www.prosoco.com](http://www.prosoco.com). Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
3. Standards: Must meet or exceed all test standards of referenced manufacturer's product.
4. Accessories and Related Products: Provide all accessories and related products as recommended by the manufacturer for a complete and proper system.

B. Seam Filler: To bridge gaps and provide support of fluid-applied flashing membrane.

1. Locations: For use in conjunction with building wrap at all transitions to beams, knife plates, and other metal items penetrating walls and where waterproof underlayment is indicated to transition for wall to metal surfaces.
2. Standards: Must meet or exceed all test standards of referenced manufacturer's product.
3. Manufacturers / Products: Prosoco, Inc. 3741 Greenway Circle, Lawrence, KS 66046; Phone: (800) 255-4255; [www.prosoco.com](http://www.prosoco.com) or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

2.4 WATERPROOF UNDERLAYMENT

- A. Self-Adhering, Polyethylene-Faced Sheet: ASTM D 1970, 40 mils (1.0 mm) thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.
1. Products: Grace, W. R. & Co.; "Ice and Water Shield", or Henry Blueskin Roof RF 200 (40 mil), or Carlisle Coatings & Waterproofing, CCW-100, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
  2. Locations: For application at furring channels at rainscreen locations.
- B. Primer for Flexible Flashing and Waterproof Underlayment: Product recommended by manufacturer of flexible flashing for substrate.
- C. Nails and Staples: ASTM F 1667.
- D. Mechanical Fasteners: Stainless steel or galvanized steel of the type and size recommended by the building wrap manufacturer for attachment of building wrap to metal stud framing or backing.

2.5 RAIN SCREEN VENT STRIP

- A. Manufacturer: JamesHardie or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
- B. Product: PVC Vent Strip, model VS8 and/or VS10, extruded rigid PVC. Provide with the manufacturer's recommended fasteners.
- C. Locations: For application in rain screen system on building walls, at bottom of wall to close rain screen space, provide venting, and prevent insects from entering the cavity.



PART 3 - EXECUTION

3.1 WATER / WEATHER-RESISTIVE BARRIER INSTALLATION

- A. Surface Preparation: Clean and prepare substrate according to the weather-resistant barrier manufacturer's written recommendations. Provide a clean and dry substrate for product application.
- B. Manufacturer's Instruction: Install weather-resistant barrier strictly following the manufacturer's printed instructions. In case of any conflict between the manufacturer's printed instructions and the field conditions, drawings or specifications, contact the Architect for clarification prior to commencement of work. Any work undertaken without such clarification will be at the Contractor's cost and risk.
1. Seal seams, edges, fasteners, and penetrations with tape.
  2. Extend into jambs of openings and seal corners with tape.
  3. Cut back barrier 1/2 inch (13 mm) on each side of the break in supporting members at expansion- or control-joint locations.
- C. Cover exposed exterior surface of sheathing with water/weather-resistive barrier securely fastened to framing immediately after sheathing is installed.
- D. Penetrations: Install manufactured penetration sleeves sized for the penetration and installed as recommended by the manufacturer. Install factory formed corners at wall openings (windows, storefront, curtain wall, doors, louvers, etc.), wall corners, and as detailed as recommended by the manufacturer. Install product as recommended by the manufacturer.
- E. Barrier Installation: Install membrane in accordance with manufacturer's written instructions over wall sheathing. Mechanically fasten the membrane so that the subsurface is protected from weather until exterior finish systems can be installed. Seal against all openings and terminations. Vertical laps shall be a minimum of 6 inches with taped joints, and horizontal laps shall be lapped 6 inches minimum shingled to direct water away from wall.

3.2 FLEXIBLE FLASHING INSTALLATION

- A. General: Install self-adhering sheet flashing underlayment, wrinkle free, over building wrap and sheathing as indicated herein and as shown on drawings. Follow manufacturer's printed installation recommendations. Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over building wrap at all inside and outside building corners, at all openings in exterior walls (doors, windows, storefront, curtain wall, louvers, etc.), at other locations shown on drawings, and as otherwise necessary to provide a watertight envelope. Install in shingle fashion to shed water, with laps of not less than 6 inches (150 mm). Overlap side edges not less than 4 inches. Roll laps with roller. Cover underlayment within 14 days, unless otherwise approved by Architect.
- B. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
1. Prime substrates as recommended by flashing manufacturer.

2. Lap seams and junctures with other materials as noted above except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over water/weather-resistive barrier at bottom and sides of openings.
4. Lap water/weather-resistive barrier over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

### 3.3 WATERPROOF UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on gypsum sheathing under wood furring and siding (stripping), as recommended by the manufacturer. Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over entire area of gypsum sheathing at rain screen wall areas, in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days, unless otherwise approved by Architect. In addition to wall area, install at other areas as indicated on drawings.
- B. If detailed, install flashings to cover underlayment to comply with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim."

### 3.4 VENT STRIP INSTALLATION

- A. Manufacturer's Instruction: Install strictly following the manufacturer's printed instructions. In case of any conflict between the manufacturer's printed instructions and the field conditions, drawings or specifications, contact the Architect for clarification prior to commencement of work. Any work undertaken without such clarification will be at the Contractor's cost and risk. Install continuous along bottom of wall finish as indicated on the drawings to close the rain screen cavity. Fasten to wall substrate as recommended by the manufacturer.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform inspections and prepare reports.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed installation of water/weather-resistant barrier and flexible flashing, including accessories. Report results in writing.
- C. Remove and replace applications of where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

1    3.6        CLEANING AND PROTECTION

- 2        A.    Remove temporary protective coverings and strippable films, if any, unless otherwise indicated  
3            in manufacturer's written installation instructions. On completion of installation, clean finished  
4            surfaces as recommended by manufacturer. Maintain in a clean condition during construction  
5            until materials are covered by other construction assemblies. Replace materials that have been  
6            damaged or have deteriorated.

7    END OF SECTION 072500



1 SECTION 074213 - METAL WALL PANELS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Vertical, concealed-fastener, lap-seam metal wall panels  
9 2. Horizontal through-fastened wall panels  
10 3. Trim Accessories

11 B. Related Sections:

- 12 1. Division 05 Section "Cold-Formed Metal Framing" for support framing, including  
13 furring, girts, studs, and bracing and for blocking needed for wall panels.  
14 2. Division 07 Section "Weather Barriers" for continuous weather barrier systems.  
15 3. Division 07 Section "Thermal Insulation" for exterior batt insulation installed as part of a  
16 complete wall envelope system directly covered by metal wall panels.  
17 4. Division 07 Section "Sheet Metal Flashing and Trim" for flashing and other sheet metal  
18 work that is not part of metal wall panel assemblies.  
19 5. Division 13 Section "Metal Building Systems" for exterior wall rigid board insulation  
20 system covered directly by metal wall panels.

21 1.3 DEFINITION

- 22 A. Metal Wall Panel Assembly: Metal wall panels, attachment system components, miscellaneous  
23 metal framing, and accessories necessary for a complete weathertight wall system.

24 1.4 PERFORMANCE REQUIREMENTS

- 25 A. General Performance: Metal wall panel assemblies shall comply with performance  
26 requirements without failure due to defective manufacture, fabrication, installation, or other  
27 defects in construction.

- 28 B. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq.  
29 m) of wall area when tested according to ASTM E 283 at the following test-pressure difference:

- 30 1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).

- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
  1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- D. Structural Performance: Provide metal wall panel assemblies capable of withstanding the effects the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592:
  1. Wind Loads: Determine loads based on the following minimum design wind pressures:
    - a. Uniform pressure of 30 lbf/sq. ft. (1436 Pa), acting inward or outward.
    - b. Uniform pressure as indicated on Drawings.
  2. Deflection Limits: Metal wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/240 of the span.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

#### 1.5 ACTION SUBMITTALS

- A. General: Coordinate submittals for metal siding, and metal flashing.
- B. Product Data: For each type of product indicated. Include general product information, construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of wall panel and accessory.
- C. Shop Drawings: Show fabrication and installation layouts of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory-, shop- and field-assembled work.
  1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):
    - a. Flashing and trim.
    - b. Anchorage systems.
- D. Samples for Initial Selection: For each type of metal wall panel indicated with factory-applied color finishes.
  1. Include similar Samples of trim and accessories involving color selection.
  2. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view.

E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Metal Wall Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other metal wall panel accessories.
2. Trim and Closures: 12 inches (305 mm) long. Include fasteners and other exposed accessories.
3. Accessories: 12-inch- (305-mm-) long Samples for each type of accessory.

#### 1.6 INFORMATIONAL SUBMITTALS

A. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

B. Coordination Drawings: Exterior elevations drawn to scale and coordinating penetrations and wall-mounted items. Show the following:

1. Wall panels and attachments.
2. Girts, studs, and secondary framing.
3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
4. Penetrations of wall by pipes and utilities.

C. Qualification Data: For Installer and professional engineer.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

E. Field quality-control reports by the manufacturer's representative.

F. Warranties: Sample of special warranties.

#### 1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal wall panels to include in maintenance manuals.

#### 1.8 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain each type of metal wall panel from single source from single manufacturer.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical wall panel profiles, inside and outside corner transitions, openings, soffit, transition and base flashing for each type of wall panel as shown on Drawings; approximately 4 by 4 foot by full thickness, including insulation, supports, attachments, and accessories.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

D. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's envelope consultant, Owner's insurer if applicable, testing and inspecting agency representative, metal wall panel Installer, metal wall panel manufacturer's representative, structural-support Installer, metal building system representative, and installers whose work interfaces with or affects metal wall panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal wall panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal wall panel assembly during and after installation.
8. Review wall panel observation and repair procedures after metal wall panel installation.
9. Review special wall panel seam alignments and other design features.
10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.9 DELIVERY, STORAGE, AND HANDLING

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



1.10 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal wall panel fabrication, and indicate measurements on Shop Drawings.

1.11 COORDINATION

- A. Coordinate all metal wall panel assemblies work with metal building system manufacturer, erector, and all other trades for rain drainage work, flashing, trim, construction of girts, studs, secondary framing, backing in walls, insulation systems, and other adjoining work to provide a complete, weathertight, secure, and noncorrosive installation.

1.12 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures including rupturing, cracking, or puncturing.
- b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Five (5) years from date of Substantial Completion.

- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: Thirty (30) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

- A. Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
2. Surface: Smooth, flat finish.
3. Exposed Coil-Coated Finish:
  - a. 2-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 MISCELLANEOUS METAL FRAMING

- A. Provided under Division 05 Section, "Cold-Formed Metal Framing". Coordinate requirements of metal wall panels with framing provided under that section.

2.3 MISCELLANEOUS MATERIALS

- A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal wall panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

2.4 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS (VERTICAL)

- A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
- B. Concealed Fastener Metal Wall Panels:

1. Basis-of-Design Product: Subject to compliance with requirements, provide AEP SPAN (www.aepspan.com); "PRESTIGE SERIES" or comparable product by one of the following. To be considered for approval, the manufacturer must have a panel that is equivalent in every respect, including, but not limited to, design, appearance, color availability, structural performance, weathertightness, warranty availability, and all other aspects of this specification section:
  - a. McElroy Metal, Inc. Approved subject to meeting all specification requirements.
  - b. Metal Sales Manufacturing. Approved subject to meeting all specification requirements.
  - c. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
2. Material: Aluminum zinc alloy-coated sheet steel
  - a. Gauge: 22 gauge.
3. Exterior Finish: "KYNAR 500" (ASTM AAMA 2605 when applied to aluminum)
  - a. Color: As indicated on Color Schedule on the drawings. The Architect also reserves the right to change the color indicated on the drawings and select another color from the manufacturer's full range of available colors at no additional charge.
4. Panel Coverage: 12 inches.
5. Panel Height: 1-1/2 inch
6. Panel Form: Flat Pan
7. Reveal: No reveal
8. Wind Clips: Provide wind clips per manufacturers recommendation.

## 2.5 THROUGH-FASTENER METAL WALL PANELS (HORIZONTAL)

- A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping adjacent panels and mechanically attaching through panel to supports using through-fasteners and factory-applied sealant in laps. Include accessories required for weathertight installation.
- B. Through-fastener Metal Wall Panels:
  1. Basis of Design Product: AEP Span, "NU-WAVE CORRUGATED", or a comparable product from a substitute manufacturer provided they can meet the requirements of these specifications including the special warranty. All substitution requests will be considered during the bid process per the Instructions to Bidders and Section 012500. To be considered for approval, the manufacturer must have a panel that is equivalent in every respect, including, but not limited to, design, appearance, color availability, structural performance, weathertightness, warranty availability, and all other aspects of this specification section.
    - a. McElroy Metal, Inc. Approved subject to meeting all specification requirements.
    - b. Metal Sales Manufacturing. Approved subject to meeting all specification requirements.

- c. Architectural Solutions. Approved subject to meeting all specification requirements.
  - d. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
2. Material: Aluminum-zinc alloy-coated steel sheet
    - a. Gauge: 24 gauge
  3. Exterior Finish: bare zincalume
    - a. Color: As indicated on Color Schedule on the drawings. The Architect also reserves the right to change the color indicated on the drawings and select another color from the manufacturer's full range of available colors at no additional charge.
  4. Clips: Floating to accommodate thermal movement.
    - a. Material: zinc-coated (galvanized) steel sheet, thickness as recommended by the panel manufacturer.
  5. Panel Coverage: 34-2/3 inches net coverage.
  6. Panel Height: 7/8 inches.
  7. Panel Form: Corrugated, smooth curving.

## 2.6 ACCESSORIES

- A. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.
  1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal wall panels.
  2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Formed from gauge matching the metal wall panels, as applicable and as indicated on the drawings. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal wall panels.

2.7 FABRICATION

- A. General: Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Fabricate metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal wall panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, and that will minimize noise from movements within panel assembly.
- E. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  - 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  - 3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
  - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
  - 5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.
  - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.8 GENERAL FINISH REQUIREMENTS

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of work.
  - 1. Examine wall framing to verify that girts, angles, channels, furring, studs, secondary framing, blocking, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
  - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
  - 3. Verify that weather-resistant barrier paper has been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
  - 4. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts, or backing/blocking in metal stud walls, as applicable, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Commence metal wall panel installation and install minimum of 500 sq. ft. in presence of factory-authorized representative.
  - 2. Shim or otherwise plumb substrates receiving metal wall panels.
  - 3. Flash and seal metal wall panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until weather barrier and flashings that will be concealed by metal wall panels are installed.
  - 4. Install screw fasteners in predrilled holes.
  - 5. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 6. Install flashing and trim as metal wall panel work proceeds.
  - 7. Panel splices are not allowed unless indicated otherwise on the drawings. Fabricate panels full length of span for all conditions.
  - 8. If panel splices are specifically allowed, locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition. Locate as shown on drawings.
  - 9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete and elsewhere as indicated or, if not indicated, as necessary for waterproofing.

10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
11. Provide weathertight escutcheons for pipe and conduit penetrating exterior walls.

B. Over Insulation Systems:

1. Batt Insulation: Install metal siding over batt insulation system, compressing insulation for tight fit without noticeable bulging. .
2. Coordinate metal panel installation at window openings to ensure weathertight conditions and alignment of corrugated flutes or seams. See Drawings for window sill details requiring careful coordination for installation of metal panels, insulation, and weatherbarrier systems.
3. Confirm method of installation in field with Architect and metal building manufacturer's representative as part of pre-installation conference.

C. Fasteners:

1. Steel Wall Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized steel fasteners for surfaces exposed to the interior.
2. Fasteners must penetrate into steel wall studs or steel backing in wall (or steel 'Z' furring where applicable) at  $\frac{1}{2}$  to  $\frac{3}{4}$  inch. Coordinate placement of studs and backing.

D. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal wall panel manufacturer.

1. Coat back-side of wall panels with bituminous coating where wall panels will contact the treated wood, ferrous metal, copper, lead, or cementitious construction.

E. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weathertight performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.

1. Seal metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.

3.3 METAL WALL PANEL INSTALLATION

A. Metal Wall Panels: Fasten metal wall panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer. Fasteners must penetrate into steel wall studs or steel backing in wall (or steel 'z' furring where applicable)  $\frac{1}{2}$  to  $\frac{3}{4}$  inch. Coordinate placement of studs, backing, and furring.

1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
2. Provide metal-backed washers under heads of exposed fasteners (if allowed) bearing on weather side of metal wall panels.

3. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
4. Provide sealant tape at lapped joints of metal wall panels and between panels and protruding equipment, vents, and accessories.
5. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps, and on side laps of nesting-type panels; on side laps of nesting-type, ribbed, or fluted panels; and elsewhere as needed to make panels weatherproof to driving rains.
6. At panel splices (if allowed), nest panels with minimum 6-inch (150-mm) end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates. Panel splices are not allowed unless specifically indicated on the drawings.
7. Coordinate seam alignment with openings as shown on the drawings.

### 3.4 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
  1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
  1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (605 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Water Penetration: Test areas of installed system indicated on Drawings for compliance with system performance requirements according to ASTM E 1105 at minimum differential pressure of 20 percent of inward-acting, wind-load design pressure as defined by SEI/ASCE 7, but not less than 6.24 lbf/sq. ft. (300 Pa).



- 1 C. Water-Spray Test: After completing the installation of 75-foot- (23-m-) by-2-story minimum  
2 area of metal wall panel assembly, test assembly for water penetration according to  
3 AAMA 501.2 in a 2-bay area directed by Architect.
- 4 D. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect and  
5 test completed metal wall panel installation, including accessories.
- 6 E. Remove and replace metal wall panels where tests and inspections indicate that they do not  
7 comply with specified requirements.
- 8 F. Additional tests and inspections, at Contractor's expense, will be performed to determine  
9 compliance of replaced or additional work with specified requirements.

10 3.6 CLEANING AND PROTECTION

- 11 A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are  
12 installed, unless otherwise indicated in manufacturer's written installation instructions. On  
13 completion of metal wall panel installation, clean finished surfaces as recommended by metal  
14 wall panel manufacturer. Maintain in a clean condition during construction.
- 15 B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt,  
16 and sealant.
- 17 C. Replace metal wall panels that have been damaged or have deteriorated beyond successful  
18 repair by finish touchup or similar minor repair procedures.

19 END OF SECTION 074213



1 SECTION 076200 - SHEET METAL FLASHING AND TRIM

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

8 1. Manufactured Products:

- 9 a. Underlayment materials  
10 b. Related accessory materials.

11 2. Formed Products:

- 12 a. Formed roof drainage sheet metal fabrications.  
13 b. Formed wall sheet metal fabrications.  
14 c. Formed equipment support flashing.  
15 d. Related accessory materials.

16 B. Related Sections:

- 17 1. Division 05 Section "Metal Fabrications" for galvanized steel gutter support brackets and  
18 galvanized steel pipe or tube down spouts. Gutter brackets to be installed under this  
19 Section.  
20 2. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.  
21 3. Division 07 Section "Metal Wall Panels" for sheet metal flashing and trim integral with  
22 metal wall panels.  
23 4. Division 09 Section "Exterior Painting" for application of powder coating to stainless  
24 steel roof crickets and flashing specified under this Section.  
25 5. Division 13 Section "Metal Building Systems" for sheet metal flashing and trim integral  
26 with metal roof panels associated with metal buildings.

27 1.3 PERFORMANCE REQUIREMENTS

- 28 A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads,  
29 structural movement, thermally induced movement, and exposure to weather without failure due  
30 to defective manufacture, fabrication, installation, or other defects in construction. Completed  
31 sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

- 32 B. Fabricate and install copings capable of resisting the following forces according to  
33 recommendations in FMG Loss Prevention Data Sheet 1-49:

1. Wind Zone 2: For velocity pressures of 31 to 45 lbf/sq. ft. (1.48 to 2.15 kPa): 90-lbf/sq. ft. (4.31-kPa) perimeter uplift force, 120-lbf/sq. ft. (5.74-kPa) corner uplift force, and 45-lbf/sq. ft. (2.15-kPa) outward force.

- C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Identification of material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of termination points and assemblies, including fixed points.
5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
7. Details of special conditions.
8. Details of connections to adjoining work.
9. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches (1:10).

- C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection. Samples shall be on actual metal chips, not printed colors applied to paper or card stock.

- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.
3. Accessories and Miscellaneous Materials: Full-size Sample.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified fabricator.
- B. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- C. Preinstallation Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's Envelope Consultant, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
  - 2. Review methods and procedures related to sheet metal flashing and trim.
  - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
  - 4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
  - 5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
  - 6. Conference shall be coordinated and held at same time as preinstallation conference for roofing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

3. Weathertightness: Provide as specified for roofing and wall system warranties where flashing components are integral with roofing and wall systems for weathertightness.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.

- 1. Finish: 2D (dull, cold rolled).
- 2. Surface: Smooth, flat.

- C. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

- 1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
- 2. Surface: Smooth, flat, and with manufacturer's standard clear acrylic coating on both sides where another finish is not specified.
- 3. Exposed Coil-Coated Finish: Provide for all flashing except where specifically indicated to be a bare galvalume or zincalume finish, if any.

- a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- 4. Color: Match color of metal wall and roof panels where applicable. See those Sections for colors. For other applications, color to be selected by Architect from manufacturer's full range of available colors, or a custom color. Quantity of colors as indicated on Color Schedule on drawings.

5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

## 2.2 UNDERLAYMENT MATERIALS

- A. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397.
- B. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- C. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
  2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
  3. Products: Subject to compliance with requirements, provide one of the following:
    - a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
    - b. Grace Construction Products, a unit of W. R. Grace & Co.; Vycor Ultra.
    - c. Henry Company; Blueskin PE200 HT.
- D. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

## 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
    - b. Blind Fasteners: High-strength stainless-steel rivets suitable for metal being fastened.
  2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
  3. Fasteners for Aluminum-Zinc Alloy-Coated Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

C. Solder:

1. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

D. Expansion Provisions: Except at standing seam copings, and unless noted otherwise for specific types of flashings or copings, where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.



- 1 E. Fabricate cleats and attachment devices from same material as accessory being anchored or  
2 from compatible, noncorrosive metal.
- 3 F. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural  
4 Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less  
5 than thickness of metal being secured.
- 6 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and  
7 FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal  
8 being secured.
- 9 G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with  
10 elastomeric sealant unless otherwise recommended by sealant manufacturer for intended  
11 use. Rivet joints where necessary for strength. Do not use graphite pencils to mark metal  
12 surfaces.

13 2.5 ROOF DRAINAGE SHEET METAL FABRICATIONS

- 14 A. Gutters: See Division 13 "Metal Building Systems".
- 15 B. Galvanized Steel Gutter Support Brackets and Spacers: Provided under Division 5 Section  
16 "Metal Fabrications".
- 17 C. Galvanized Steel Downspouts: Provided under Division 5 Section "Metal Fabrications".
- 18 D. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to  
19 exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm)  
20 beyond cant or tapered strip into field of roof, unless detailed otherwise. Fabricate from the  
21 following materials:
- 22 1. Stainless Steel: 0.019 inch (0.48 mm) thick.
- 23 E. Wire strainers for Downspout inlets at Gutters: Galvanized steel or stainless steel (as indicated  
24 on drawings) wire strainers for conductor heads and gutters, size to match downspout size.

25 2.6 WALL SHEET METAL FABRICATIONS

- 26 A. Opening and Penetration Flashings in Frame Construction: Fabricate head, sill, jamb, and  
27 similar flashings to extend 4 inches (100 mm) beyond wall openings, unless detailed otherwise.  
28 Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the  
29 following materials:
- 30 1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick, unless noted otherwise  
31 on the drawings.

2.7 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment or Skylight Support Flashing: Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.2 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings.

B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

C. Self-Adhering Sheet Underlayment: Where indicated on the drawings, install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

- 1           2.     Install sheet metal flashing and trim to fit substrates and to result in watertight  
2             performance. Verify shapes and dimensions of surfaces to be covered before fabricating  
3             sheet metal.
- 4           a.     Space cleats not more than 12 inches (300) apart. Anchor each cleat with a  
5             minimum of two fasteners. Bend tabs over fasteners.
- 6           3.     Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two  
7             fasteners. Bend tabs over fasteners.
- 8           4.     Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and  
9             tool marks.
- 10          5.     Install sealant tape where indicated.
- 11          6.     Torch cutting of sheet metal flashing and trim is not permitted.
- 12          7.     Do not use graphite pencils to mark metal surfaces.
- 13    B.     Metal Protection: Where dissimilar metals will contact each other or corrosive substrates,  
14             protect against galvanic action by painting contact surfaces with bituminous coating or by other  
15             permanent separation as recommended by SMACNA.
- 16          1.     Coat back side of stainless-steel sheet metal flashing and trim with bituminous coating  
17             where flashing and trim will contact wood, ferrous metal, or cementitious construction.
- 18          2.     Underlayment: Where installing metal flashing directly on cementitious or wood  
19             substrates, install a course of felt underlayment and cover with a slip sheet or install a  
20             course of polyethylene sheet.
- 21    C.     Expansion Provisions: Except at standing seam copings or where detailed otherwise, provide  
22             for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of  
23             10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection.  
24             Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form  
25             expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with  
26             sealant concealed within joints.
- 27    D.     Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4  
28             inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws, and metal  
29             decking not less than recommended by fastener manufacturer to achieve maximum pull-out  
30             resistance.
- 31    E.     Seal joints as shown and as required for watertight construction.
- 32          1.     Where sealant-filled joints are used, embed hooked flanges of joint members not less than  
33             1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient  
34             temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21  
35             deg C), set joint members for 50 percent movement each way. Adjust setting  
36             proportionately for installation at higher ambient temperatures. Do not install sealant-  
37             type joints at temperatures below 40 deg F (4 deg C).
- 38          2.     Prepare joints and apply sealants to comply with requirements in Division 07 Section  
39             "Joint Sealants."
- 40          3.     Flashing Lap Joints: At all lap joints in metal flashings, lap sheet metal a minimum of 4  
41             inches, or more if recommend by SMACNA, or more if indicated on the drawings.  
42             Install at least two continuous beads of sealant in each lap joint within and fully  
43             concealed by the lap joint.

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel sheet.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
3. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

#### 3.4 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Downspouts:

1. Provided under Division 5 Section "Metal Fabrications."
2. Provide elbows at base of downspout to direct water away from building, unless indicated otherwise.
3. Connect downspouts to underground drainage system indicated.

#### 3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing, unless indicated otherwise. Install stainless-steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with sealant. Secure in a waterproof manner by means of interlocking folded seam or blind rivets and sealant, unless detailed otherwise.

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

1     3.6     WALL FLASHING INSTALLATION

2     A.     General: Install sheet metal wall flashing to intercept and exclude penetrating moisture  
3     according to SMACNA recommendations and as indicated. Coordinate installation of wall  
4     flashing with installation of wall-opening components such as windows, doors, and louvers.

5     B.     Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar  
6     flashings to extend 4 inches (100 mm) beyond wall openings, unless detailed otherwise.

7     3.7     ERECTION TOLERANCES

8     A.     Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance  
9     of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch  
10    (3-mm) offset of adjoining faces and of alignment of matching profiles.

11    3.8     CLEANING AND PROTECTION

12    A.     Clean exposed metal surfaces of substances that interfere with uniform oxidation and  
13    weathering.

14    B.     Clean and neutralize flux materials. Clean off excess solder.

15    C.     Clean off excess sealants.

16    D.     Remove temporary protective coverings and strippable films as sheet metal flashing and trim  
17    are installed unless otherwise indicated in manufacturer's written installation instructions. On  
18    completion of installation, remove unused materials and clean finished surfaces. Maintain in a  
19    clean condition during construction.

20    E.     Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond  
21    successful repair by finish touchup or similar minor repair procedures.

22    END OF SECTION 076200



1 SECTION 079200 - JOINT SEALANTS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Urethane joint sealants.  
9 2. Latex joint sealants.  
10 3. Acoustical joint sealants.

11 B. Related Sections:

- 12 1. Division 07 Sections for sealants used in conjunction with sheet metal flashing, wall and  
13 roof panels.  
14 2. Division 08 Section "Glazing" for glazing sealants.  
15 3. Division 08 Sections for sealants used with aluminum framed opening systems.  
16 4. Division 09 Section "Gypsum Board" for sealing perimeter joints.  
17 5. Division 09 Section "Tiling" for sealing tile joints.  
18 6. Division 09 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters  
19 with acoustical sealant.  
20 7. Division 32 Sections for sealing joints in pavements, walkways, and curbing.

21 1.3 ACTION SUBMITTALS

- 22 A. Product Data: For each joint-sealant product indicated.

- 23 B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants  
24 showing the full range of colors available for each product exposed to view.

- 25 C. Samples for Verification: For each kind and color of joint sealant required, provide Samples  
26 with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-)  
27 long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- 28 D. Joint-Sealant Schedule: Include the following information:

- 29 1. Joint-sealant application, joint location, and designation.  
30 2. Joint-sealant manufacturer and product name.  
31 3. Joint-sealant formulation.  
32 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
- B. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
  - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.



PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Architectural Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
  - 1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 POLYURETHANE JOINT SEALANTS

- A. Non-sag: ASTM C920 and FS TT-S-00227E, Type II Class A for non-sag type for vertical surfaces, non-staining type for porous and non-porous surfaces. Colors as selected from color line equal to Sika Corporations 40 designer color line. Use the following locations:
  - 1. At normal movement dynamic vertical joints and expansion-control joints.
  - 2. Under metal stud plates set on exterior foundation walls.
  - 3. At connections between exterior door frame and storefront frames, and window frame surfaces and adjacent wall construction.
  - 4. At all connections between hollow metal relite frames and plastic laminate finish.
  - 5. At all connections between window framing and interior casings if any.
  - 6. Under hemmed edge of window sill flashings.
  - 7. At all connections between exterior aluminum storefront/curtain wall frames and gypsum wallboard wall and ceiling finish.

8. At all other locations where sealant is shown, and not noted in this section, except as specified otherwise to be furnished by painting trade under work of the Painting Section.

B. Self-Leveling: ASTM C920 FS TT-S-0027E, Type I Class A self leveling type for horizontal surfaces, non-staining type for porous and non-porous surfaces. Standard color as selected. Use as horizontal expansion joints in concrete walks and slabs where sealant is shown.

## 2.3 LATEX JOINT SEALANTS

A. General: Provide manufacturer's standard one-part, non-sag mildew resistant, paintable latex sealant of formulation indicated that is recommended for exposed applications on interior and protected exterior locations and that accommodates indicated percentage change in joint width existing at time of installation without failing either adhesively or cohesively.

B. Silicone Emulsion Sealant: Provide product complying with ASTM C 834 and, except for weight loss measured per ASTM C 792, with ASTM C 920 that accommodates joint movement of not more than 25 percent in both extension and compression for a total of 50 percent.

1. At interior locations where sealant is required which are subject to mildew.
2. Sealant along top of ceramic tile wainscots.
3. Sealant along top of ceramic tile wall covering at showers
4. At all connections between interior window and storefront frame surfaces and adjacent plastic laminate sills.

## 2.4 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

## 2.5 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Unglazed surfaces of ceramic tile.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.

- 1 c. Porcelain enamel.
- 2 d. Glazed surfaces of ceramic tile.
- 3 B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as
- 4 indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to
- 5 comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-
- 6 sealant bond; do not allow spillage or migration onto adjoining surfaces.
- 7 C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with
- 8 adjoining surfaces that otherwise would be permanently stained or damaged by such contact or
- 9 by cleaning methods required to remove sealant smears. Remove tape immediately after tooling
- 10 without disturbing joint seal.
- 11 3.3 INSTALLATION OF JOINT SEALANTS
- 12 A. General: Comply with joint-sealant manufacturer's written installation instructions for products
- 13 and applications indicated, unless more stringent requirements apply.
- 14 B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint
- 15 sealants as applicable to materials, applications, and conditions indicated.
- 16 C. Install sealant backings of kind indicated to support sealants during application and at position
- 17 required to produce cross-sectional shapes and depths of installed sealants relative to joint
- 18 widths that allow optimum sealant movement capability.
- 19 1. Do not leave gaps between ends of sealant backings.
- 20 2. Do not stretch, twist, puncture, or tear sealant backings.
- 21 3. Remove absorbent sealant backings that have become wet before sealant application and
- 22 replace them with dry materials.
- 23 D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants
- 24 and backs of joints.
- 25 E. Install sealants using proven techniques that comply with the following and at the same time
- 26 backings are installed:
- 27 1. Place sealants so they directly contact and fully wet joint substrates.
- 28 2. Completely fill recesses in each joint configuration.
- 29 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow
- 30 optimum sealant movement capability.
- 31 F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or
- 32 curing begins, tool sealants according to requirements specified in subparagraphs below to form
- 33 smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure
- 34 contact and adhesion of sealant with sides of joint.
- 35 1. Remove excess sealant from surfaces adjacent to joints.
- 36 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not
- 37 discolor sealants or adjacent surfaces.

3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

- G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

### 3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Owner may, at their choice, engage a firm to field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

- a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
- b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

- a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

- a. Whether sealants filled joint cavities and are free of voids.
- b. Whether sealant dimensions and configurations comply with specified requirements.
- c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

- B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other

1 requirements. Retest failed applications until test results prove sealants comply with indicated  
2 requirements. All retesting of failed sealant joints shall be at the Contractor's expense.

3 3.5 CLEANING

4 A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods  
5 and with cleaning materials approved in writing by manufacturers of joint sealants and of  
6 products in which joints occur.

7 3.6 PROTECTION

8 A. Protect joint sealants during and after curing period from contact with contaminating substances  
9 and from damage resulting from construction operations or other causes so sealants are without  
10 deterioration or damage at time of Substantial Completion. If, despite such protection, damage  
11 or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately  
12 so installations with repaired areas are indistinguishable from original work.

13 END OF SECTION 079200

1 SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Hollow metal doors, frames and relites.

9 B. Related Sections:

- 10 1. Division 07 Section "Weather Barriers" for coordination of installation with waterproof  
11 underlayment flashing.  
12 2. Division 08 Section "Flush Wood Doors" for wood doors installed in steel frames.  
13 3. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.  
14 4. Division 09 Section "Painting" for field painting hollow metal doors and frames.  
15 5. Division 26 Sections for electrical connections including conduit and wiring for door  
16 controls and operators.

17 1.3 DEFINITIONS

- 18 A. Minimum Thickness: Minimum thickness of base metal without coatings.

- 19 B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

- 20 C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-  
21 HMMA 861.

22 1.4 ACTION SUBMITTALS

- 23 A. Product Data: For each type of product indicated. Include construction details, material  
24 descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.

- 25 B. Shop Drawings: Include the following:

- 26 1. Elevations of each door design.  
27 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.  
28 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.  
29 4. Locations of reinforcement and preparations for hardware.  
30 5. Details of each different wall opening condition.  
31 6. Details of anchorages, joints, field splices, and connections.

7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Verification:

1. For the following items, prepared on Samples about 12 by 12 inches (305 by 305 mm) to demonstrate compliance with requirements for quality of materials and construction:
  - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
  - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.

D. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

- A. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.
- B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784 or UBC Standard 7-2 or IBC 715.4.3, as is acceptable to the agency having jurisdiction.
- C. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
  1. Provide additional protection to prevent damage to finish of factory-finished units.



- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.
- 1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

## 1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

## 1.9 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

# PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ceco Door Products; an ASSA ABLOY Group Company.
  - 2. Curries Company; an ASSA ABLOY Group Company.
  - 3. Republic Builders Products Company.
  - 4. Steelcraft; an Ingersoll-Rand Company.
  - 5. Stiles Custom Metals, Inc.
  - 6. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

## 2.2 MATERIALS

- A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- B. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- D. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- E. Grout: Provide as required in Division 3 Section "Grout and Underlayments".
- F. Glazing: Comply with requirements in Division 08 Section "Glazing."
- G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.3 HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
  - 1. Design: Flush panel.
  - 2. Core Construction: Manufacturer's standard polyisocyanurate core.
    - a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 12.3 deg F x h x sq. ft./Btu (2.166 K x sq. m/W) when tested according to ASTM C 1363. U Value 0.08.
  - 1) Locations: Exterior doors.
  - 3. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch (54-mm) radius.
  - 4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
  - 5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior and Interior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  - 1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
- C. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- D. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior and Interior Frames: Fabricated from metallic-coated steel sheet.
  - 1. Fabricate frames with mitered or coped corners.
  - 2. Fabricate frames as full profile welded unless otherwise indicated.
  - 3. Frames for Steel Doors: 0.067-inch- (1.7-mm-) thick steel sheet.
- C. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
  - 2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:
  - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (50-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as frames in which they are installed.

2.7 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- (6.4-mm-thick by 25.4-mm-) wide steel.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

2.8 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Doors:
1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  2. Glazed Lites: Factory cut openings in doors.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Fully weld flush face joints and throats continuously; grind, fill, dress, and make smooth, flush, and invisible.
  2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  5. Where installed in masonry, leave vertical jambs in frames open at top for grouting. Do not grout mullions.
  6. Do not grout any vertical or horizontal mullions. Provide solid metal panel to stop grout from entering the mullions.
  7. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  8. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Stud-Wall 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. and as follows:
      - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
      - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
      - 5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.
    - b. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

9. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
- b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

- 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
- 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
- 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
- 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

- 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
- 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings, so that each glazed lite is capable of being removed independently.
- 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
- 4. Provide loose stops and moldings on inside of hollow metal work.
- 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

## 2.9 STEEL FINISHES

A. Metallic-Coated Steel Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

- 1. Galvanizing Repair Paint: High-zinc-dust-control paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 82 percent zinc dust by weight, as recommended by the door manufacturer, and compatible with the primer specified in Division 9 Section "High Performance Coatings".

B. Priming: Doors and frames to be field primed and painted.

- C. Protective Coating: In addition to the prime paint specified above for all surfaces of steel frames, for all steel frames, apply a coating of bituminous paint over the prime paint to all concealed portions of the frame, for both building interior and exterior frames. This coating shall extend over all surfaces of the concealed portions of the assembled frame to provide additional corrosion protection from moisture in the frame grout. Verify bituminous paint is compatible with UL tested Fire Ratings.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
  3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

#### 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

- a. At fire-protection-rated openings, install frames according to NFPA 80.
- b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
- c. Install frames with removable glazing stops located on secure side of opening.
- d. Install door silencers in frames before grouting.
- e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
- f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
- g. Field apply bituminous coating to all concealed surfaces of frames that are filled with mortar, grout, and plaster containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

- a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Grout frames as indicated on drawings. If no grout is indicated, solidly pack mineral-fiber insulation behind frames.

4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

- a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
- b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
- c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
- d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

5. Mullions: Do not grout closed tube type mullions, such as mullions between door and glass, or glass and glass.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

- a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
- b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
- c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).

1                   d.     Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4  
2                   inch (19 mm).

3     D.     Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with  
4             hollow metal manufacturer's written instructions.

5             1.     Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not  
6                   more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each  
7                   corner.

8     3.4     ADJUSTING AND CLEANING

9     A.     Final Adjustments: Check and readjust operating hardware items immediately before final  
10            inspection. Leave work in complete and proper operating condition. Remove and replace  
11            defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

12    B.     Remove grout and other bonding material from hollow metal work immediately after  
13            installation.

14    C.     Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint  
15            according to manufacturer's written instructions.

16    END OF SECTION 081113



1 SECTION 081416 - FLUSH WOOD DOORS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Solid-core doors with wood-veneer faces.  
9 2. Factory finishing flush wood doors.  
10 3. Factory fitting flush wood doors to frames and factory machining for hardware.

- 11 B. Related Sections:

- 12 1. Division 08 Section "Hollow Metal Doors and Frames" for steel frames to hold flush  
13 wood doors.  
14 2. Division 08 Section "Door Hardware" to coordinate hardware for use with wood finish  
15 doors.  
16 3. Division 08 Section "Glazing" for glass view panels in flush wood doors.

17 1.3 ACTION SUBMITTALS

- 18 A. Product Data: For each type of door indicated. Include details of core and edge construction  
19 and trim for openings. Include factory-finishing specifications.

- 20 B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door;  
21 construction details not covered in Product Data; location and extent of hardware blocking; and  
22 other pertinent data.

- 23 1. Indicate dimensions and locations of mortises and holes for hardware.  
24 2. Indicate dimensions and locations of cutouts.  
25 3. Indicate requirements for veneer matching.  
26 4. Indicate doors to be factory finished and finish requirements.  
27 5. Indicate fire-protection ratings for fire-rated doors.

- 28 C. Samples for Initial Selection: For factory-finished doors.

- 29 D. Samples for Verification:

- 30 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200  
31 by 250 mm), for each material and finish. For each wood species and transparent finish,  
32 provide set of three samples showing typical range of color and grain to be expected in  
33 the finished work.

2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.

a. Provide samples for each species of veneer and solid lumber required.

b. Finish veneer-faced door samples with same materials proposed for factory-finished doors.

3. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

#### 1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

#### 1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors from single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

C. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package and wrap bundles of doors in plastic sheeting and cardboard as required to protect doors during transportation.

C. Mark each door on top rail with opening number used on Shop Drawings.

#### 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

#### 1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- 1                   a.     Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch
- 2                             (1067-by-2134-mm) section.
- 3                   b.     Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch
- 4                             (0.25 mm in a 76.2-mm) span.
- 5                2.     Warranty shall also include installation and finishing that may be required due to repair
- 6                             or replacement of defective doors.
- 7                3.     Warranty Period for Solid-Core Interior Doors: Life of installation.

## 8     PART 2 - PRODUCTS

### 9     2.1     MANUFACTURERS

- 10       A.     Manufacturers: Subject to compliance with requirements, provide products by one of the
- 11                     following:
- 12               1.     Algoma Hardwoods, Inc.
- 13               2.     Eggers Industries.
- 14               3.     Marshfield Door Systems, Inc.
- 15               4.     Vancouver Door Company.
- 16               5.     VT Industries Inc.
- 17               6.     Or approved substitute during the bid process per the Instructions to Bidders and
- 18                     Specification Section 012500.

### 19    2.2     DOOR CONSTRUCTION, GENERAL

- 20       A.     Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do
- 21                     not contain added urea formaldehyde.
- 22       B.     WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
- 23       C.     Structural-Composite-Lumber-Core Doors:
- 24               1.     Structural Composite Lumber: WDMA I.S.10.
- 25                     a.     Screw Withdrawal, Face: 700 lbf (3100 N).
- 26       D.     Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-
- 27                     protection rating indicated.
- 28               1.     Edge Construction: Where required by fire rating or agency having jurisdiction, provide
- 29                             edge construction with intumescent seals concealed by outer stile. Comply with specified
- 30                             requirements for exposed edges.
- 31               2.     Pairs: Where required by fire rating or agency having jurisdiction, provide fire-retardant
- 32                             stiles that are listed and labeled for applications indicated without formed-steel edges and
- 33                             astragals. Comply with specified requirements for exposed edges.
- 34               3.     Pairs: Provide formed-steel edges and astragals.
- 35                     a.     Finish steel edges and astragals to match door hardware (locksets or exit devices).

E. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as follows:
  - a. 5-inch (125-mm) top-rail blocking.
  - b. 5-inch (125-mm) bottom-rail blocking, in doors indicated to have protection plates.
  - c. 5-inch (125-mm) midrail blocking, in doors indicated to have armor plates.
  - d. 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: Select white oak.
3. Cut: Rift cut.
4. Match between Veneer Leaves: Slip match.
5. Assembly of Veneer Leaves on Door Faces: Balance match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 20 feet (6 m) or more.
8. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
9. Exposed Vertical and Top Edges: Same species as faces.
10. Core: Bonded Structural Composite Lumber Core with solid styles.
11. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.
12. Provide ½" undercut for air flow.

2.4 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.

2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."

2.6 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory.

C. Transparent Finish:

1. Grade: Premium.

2. Finish: AWI catalyzed polyurethane system.

3. Staining: As selected by Architect from manufacturer's full range. See Color Schedule on the drawings. The Architect reserves the right to change stain colors without additional cost.

4. Effect: Open-grain finish.

5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

- 1           1.     Verify that frames comply with indicated requirements for type, size, location, and swing
- 2                 characteristics and have been installed with level heads and plumb jambs.
- 3           2.     Reject doors with defects.

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

### 5   3.2     INSTALLATION

- 6       A.     Hardware: For installation, see Division 08 Section "Door Hardware."
- 7       B.     Installation Instructions: Install doors to comply with manufacturer's written instructions and
- 8                 the referenced quality standard, and as indicated.
- 9       C.     Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- 10      D.     Factory-Finished Doors: Restore finish before installation if fitting or machining is required at
- 11                 Project site.

### 12 3.3     ADJUSTING

- 13      A.     Operation: Rehang or replace doors that do not swing or operate freely.
- 14      B.     Finished Doors: Replace doors that are damaged or that do not comply with requirements.
- 15                 Doors may be repaired or refinished if work complies with requirements and shows no evidence
- 16                 of repair or refinishing.

### 17 END OF SECTION 081416

1 SECTION 083113 - ACCESS DOORS AND FRAMES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Access doors and frames for walls and ceilings.

- 9 B. Related Requirements:

- 10 1. Division 08 Section “Door Hardware” for cylinders provided under that Section for doors  
11 with locks under this Section.  
12 2. Division 23 Sections for heating and air-conditioning duct access doors.

13 1.3 ACTION SUBMITTALS

- 14 A. Buy America: Certification that all steel components are provided in compliance with the Buy  
15 America requirements.

- 16 B. Product Data: For each type of product.

- 17 1. Include construction details, fire ratings, materials, individual components and profiles,  
18 and finishes.

- 19 C. Shop Drawings:

- 20 1. Include plans, elevations, sections, details, and attachments to other work.  
21 2. Detail fabrication and installation of access doors and floor hatches for each type of  
22 substrate.

- 23 D. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in  
24 specified finish.

- 25 E. Product Schedule: Provide complete access door and frame schedule, including types,  
26 locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.4 WARRANTIES

- A. Manufacturer's standard warranty: Materials shall be free of defects in material and workmanship for a period of (5) five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge. Electrical motors, special finishes, and other special equipment (if applicable) shall be warranted separately by the manufacturers of those products
- B. Manufacturer's Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Access Panel Solutions, Inc (APS).
  2. Acudor Products, Inc.
  3. Alfab, Inc.
  4. Babcock-Davis.
  5. Cendrex Inc.
  6. Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
  7. Jensen Industries; Div. of Broan-Nutone, LLC.
  8. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
  9. Karp Associates, Inc.
  10. Larsen's Manufacturing Company.
  11. Maxam Metal Products Limited.
  12. Metropolitan Door Industries Corp.
  13. MIFAB, Inc.
  14. Milcor Inc.
  15. Nystrom, Inc.
  16. Williams Bros. Corporation of America (The).
- B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.
- C. Flush Access Doors with Concealed Flanges:
1. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
  2. Locations: Walls and ceilings with gypsum board .
  3. Door Size: 24 by 24 inches unless indicated otherwise on the drawings. .
  4. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage.
    - a. Finish: Factory prime.
  5. Frame Material: Same material, thickness, and finish as door.



6. Hinges: Continuous piano hinge.
7. Hardware: Key operated lock with cylinder as specified under Division 8 Section "Door Hardware".

D. Fire-Rated, Flush Access Doors with Concealed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame, uninsulated. Provide self-latching door with automatic closer and interior latch release. Provide frame with gypsum board beads for concealed flange installation.
2. Locations: Walls and ceilings with gypsum board .
3. Door Size: 24 by 24 inches unless indicated otherwise on the drawings. .
4. Fire-Resistance Rating: Not less than that of adjacent construction, or as indicated on the drawings, whichever is greater.
5. Temperature-Rise Rating: If required by agency having jurisdiction, provide 450 deg F (250 deg C) at the end of 30 minutes.
6. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage.
  - a. Finish: Factory prime.
7. Frame Material: Same material, thickness, and finish as door.
8. Hinges: Continuous piano hinge.
9. Hardware: Key operated lock with cylinder as specified under Division 8 Section "Door Hardware".

E. Hardware:

1. Lock: Mortise cylinder.
  - a. Lock Preparation: Prepare door panel to accept cylinder specified in Division 08 Section "Door Hardware."

2.2 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Frame Anchors: Same type as door face.
- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
2. Provide mounting holes in frames for attachment of units to metal or wood framing.
3. Provide mounting holes in frame for attachment of masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder locks, furnish two keys per lock and key all locks alike.

## 2.4 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

- 1      B.      Install doors flush with adjacent finish surfaces or recessed to receive finish material.
- 2      3.3      ADJUSTING
- 3      A.      Adjust doors and hardware, after installation, for proper operation.
- 4      B.      Remove and replace doors and frames that are warped, bowed, or otherwise damaged.
- 5      END OF SECTION 083113



1 SECTION 083613 - SECTIONAL DOORS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes electrically operated, insulated sectional overhead doors.

8 B. Related Sections:

- 9 1. Division 05 Section "Metal Fabrications" for miscellaneous steel supports.  
10 2. Division 08 Section "Glazing" for glass lites installed in sectional overhead doors.  
11 3. Division 09 Section(s) "Exterior Painting" and "Interior Painting" for finish painting of  
12 factory-primed doors.  
13 4. Division 26 Sections for electrical service and connections for powered operators and  
14 accessories.

15 1.3 PERFORMANCE REQUIREMENTS

- 16 A. General Performance: Sectional doors shall meet performance requirements specified without  
17 failure due to defective manufacture, fabrication, installation, or other defects in construction  
18 and without requiring temporary installation of reinforcing components.

- 19 B. Delegated Design: Design sectional doors, including comprehensive engineering analysis by a  
20 qualified professional engineer, using performance requirements and design criteria indicated.

- 21 C. Structural Performance: Exterior sectional doors shall withstand the effects of gravity loads,  
22 and the following loads and stresses within limits and under conditions indicated according to  
23 ASCE/SEI 7

- 24 1. Wind Loads: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting  
25 inward and outward.

- 26 a. Basic Wind Speed: 85 mph (38 m/s).  
27 b. Importance Factor: 1.5  
28 c. Exposure Category: C.

- 29 2. Deflection Limits: Design sectional doors to withstand design wind loads without  
30 evidencing permanent deformation or disengagement of door components. Deflection of  
31 door in horizontal position (open) shall not exceed 1/120 of the door width.

32

- D. Air Infiltration: Maximum rate not more than indicated when tested according to ASTM E 283.
1. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. (0.406 L/s per sq. m) at 15 and 25 mph (24.1 and 40.2 km/h).
- E. Windborne-Debris-Impact-Resistance Performance: Provide glazed sectional doors that pass large-missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and ASTM E 1996.
- F. Seismic Performance: Sectional doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
2. Seismic Component Importance Factor: 1.0.
- G. Operation Cycles: Provide sectional door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory. Include the following:
1. Construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
1. Include similar Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Flat Door Sections: 6 inches (150 mm) square.
2. Frame for Paneled Door Sections: 6 inches (150 mm) long of each width of stile and rail required.

3. Panel for Raised-Panel Door Sections: 12 inches (300 mm) square at panel corner, but not smaller than required to show raised-panel profile.

E. Delegated-Design Submittal: For sectional doors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of seismic restraints.
2. Summary of forces and loads on walls and jambs.

#### 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

C. Seismic Qualification Certificates: For sectional doors, accessories, and components, from manufacturer.

D. Warranties: Sample of special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sectional doors to include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain sectional doors from single source from single manufacturer.

1. Obtain operators and controls from sectional door manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Standard for Sectional Doors: Fabricate sectional doors to comply with DASMA 102 unless otherwise indicated.

E. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1.

F. Preinstallation Conference: Conduct meeting at Project site.

1. Meet with Owner, Architect, sectional door installer, sectional door manufacturer's representative, bridge crane installer, and installers whose work interfaces with sectional doors.
2. Review required clearances for sectional doors, crane and equipment.
3. Review construction schedule of involved trades.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures including, but not limited to, excessive deflection.
- b. Faulty operation of hardware.
- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
- d. Delamination of exterior or interior facing materials.

2. Warranty Period: Five (5) years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

1.9 Project Conditions

A. Field Measurements: Sectional door installer to field verify opening sizes, heights, clearances, and other dimensions and indicated measurements on shop drawings.

PART 2 - PRODUCTS

2.1 STEEL DOOR SECTIONS

A. Exterior Section Faces and Frames: Fabricate from zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated zinc coating and thickness.

1. Fabricate section faces from single sheets to provide sections not more than 24 inches (610 mm) high and of indicated thickness. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weathertight seal, with a reinforcing flange return.



2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.

B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch- (1.63-mm-) nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch- (1.63-mm-) thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches (1219 mm) apart.

C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.

D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.

E. Provide reinforcement for hardware attachment.

F. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel sections that incorporate the following interior facing material, with no exposed insulation:

1. Interior Facing Material: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated thickness.
2. Interior Facing Material: Manufacturer's standard prefinished hardboard panel, 1/8 inch (3 mm) thick and complying with ANSI A135.5.

G. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.

## 2.2 TRACKS, SUPPORTS, AND ACCESSORIES

A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances shown on Drawings, and complying with ASTM A 653/A 653M for minimum G60 (Z180) zinc coating. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slot vertical sections of track spaced 2 inches (51 mm) apart for door-drop safety device. Slope tracks at proper angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.

B. Track Reinforcement and Supports: Galvanized-steel track reinforcement and support members, complying with ASTM A 36/A 36M and ASTM A 123/A 123M. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.

1. Vertical Track Assembly: Track with continuous reinforcing angle attached to track and attached to wall with jamb brackets.

2. Horizontal Track Assembly: Track with continuous reinforcing angle attached to track and supported at points from curve in track to end of track by laterally braced attachments to overhead structural members.

C. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.

D. Windows: Manufacturer's standard window units of type and size indicated and in arrangement shown. Set glazing in vinyl, rubber, or neoprene glazing channel for metal-framed doors and elastic glazing compound for wood doors, as required. Provide removable stops of same material as door-section frames.

### 2.3 HARDWARE

A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.

B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch- (2.01-mm-) nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges where required, for doors over 16 feet (4.88 m) wide unless otherwise recommended by door manufacturer.

C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch- (76-mm-) diameter roller tires for 3-inch- (76-mm-) wide track and 2-inch- (51-mm-) diameter roller tires for 2-inch- (51-mm-) wide track.

D. Push/Pull Handles: For push-up or emergency-operated doors, provide galvanized-steel lifting handles on each side of door.

### 2.4 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only.

B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

### 2.5 COUNTERBALANCE MECHANISM

A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A 229/A 229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.

- B. Weight Counterbalance: Counterbalance mechanism consisting of filled pipe weights that move vertically in a galvanized-steel weight pipe. Connect pipe weights with cable to weight-cable drums mounted on torsion shaft made of steel tube or solid steel.
- C. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft. Provide one additional midpoint bracket for shafts up to 16 feet (4.88 m) long and two additional brackets at one-third points to support shafts more than 16 feet (4.88 m) long unless closer spacing is recommended by door manufacturer.
- D. Cables: Galvanized-steel lifting cables with cable safety factor of at least 5 to 1.
- E. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.
- F. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- G. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

## 2.6 MANUAL DOOR OPERATORS

- A. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25-lbf (111-N) force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

## 2.7 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
  - 1. Comply with NFPA 70.
  - 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
  - 1. Jackshaft, Center Mounted: Jackshaft operator mounted on the inside front wall above door and connected to torsion shaft with an adjustable coupling or drive chain.

2. Jackshaft, Side Mounted: Jackshaft operator mounted on the inside front wall on right or left side of door and connected to torsion shaft with an adjustable coupling or drive chain.
- D. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Division 11 Section "Common Motor Requirements for Equipment" unless otherwise indicated.
  1. Electrical Characteristics:
    - a. Phase: Three phase.
    - b. Volts: 115
    - c. Hertz: 60.
  2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
  3. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. (203 mm/s) and not more than 12 in./sec. (305 mm/s), without exceeding nameplate ratings or service factor.
  4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
  5. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
  6. Use adjustable motor-mounting bases for belt-driven operators.
  7. Mounting: Center Mount
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Device: Equip motorized door with indicated external automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
  1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
    - a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensor device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.
- G. Remote-Control Station: Momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf (111 N).
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount

mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

K. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with regulatory requirements for accessibility.

## 2.8 DOOR ASSEMBLY

A. Steel Sectional Door: Sectional door formed with hinged sections.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Overhead Door Corporation "THERMACORE" Series 599 Door System or comparable product by one of the following:

- a. Amarr Garage Doors.
- b. Arm-R-Lite.
- c. C.H.I. Overhead Doors.
- d. Clopay Building Products; a Griffon company.
- e. Fimbel Architectural Door Specialties.
- f. General American Door Company.
- g. Haas Door; a Nofziger company.
- h. Martin Door Manufacturing.
- i. Overhead Door Corp.
- j. Raynor.
- k. Rite-Hite Corporation.
- l. Wayne-Dalton Corp.
- m. Windsor Republic Doors.
- n. Or approved substitute during the bid process per Specification Sections 002100 and 012500.

B. Operation Cycles: Not less than 100,000

C. Installed R-Value: 17.5 deg F x h x sq. ft./Btu (3.082 K x sq. m/W)

D. U-Value: 0.057

E. Steel Sections: Zinc-coated (galvanized) steel sheet with G60 (Z180) zinc coating.

1. Section Thickness: 2 inches (51 mm).
2. Exterior-Face, Steel Sheet Thickness: 0.015-inch- (0.38-mm-) nominal coated thickness.
  - a. Surface: Flush, Textured.
3. Insulation: Foamed in place.
4. Interior Facing Material: Zinc-coated (galvanized) steel sheet of manufacturer's recommended thickness to meet performance requirements nominal coated thickness.

F. Track Configuration: 2" vertical high-lift track

G. Weatherseals: Fitted to bottom and top and around entire perimeter of door. Provide combination bottom weatherseal and sensor edge.

H. Windows: Approximately 24 by 11 inches (610 by 279 mm) with square corners, and spaced apart the approximate distance as indicated on Drawings; in two or three rows as indicated on Drawings; installed with[ insulated] glazing of the following type:

1. Insulating Glass: As specified in Division 8, "Glazing."

I. Roller-Tire Material: Case-hardened steel

J. Locking Devices: Equip door with slide bolt for padlock, locking device assembly, and chain lock keeper.

1. Locking Device Assembly: Single-jamb side, locking bars, operable from inside with thumb-turn.

K. Counterbalance Type: Torsion spring.

L. Manual Door Operator: Chain-hoist operator.

M. Electric Door Operator:

1. Usage Classification: Standard duty, up to 60 cycles per hour.

2. Operator Type: Jackshaft, center mounted or side mounted as shown on Drawings.

3. Motor Exposure: Interior, clean, and dry.

4. Emergency Manual Operation: Chain type.

5. Obstruction-Detection Device: Automatic photoelectric sensor

a. Sensor Edge Bulb Color: As selected by Architect from manufacturer's full range

6. Other Equipment: Audible and visual signals, Radio-control system.

N. Door Finish:

1. Factory Prime Finish: Manufacturer's standard color.

2. Finish of Interior Facing Material: Finish as selected by Architect from manufacturer's full range.

3. Exterior Finish: Field paint, color to match Architect's color chip.

## 2.9 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 STEEL AND GALVANIZED-STEEL FINISHES

- A. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks:
1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24 inches (610 mm) apart.
  2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
  3. Repair galvanized coating on tracks according to ASTM A 780.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

3.3 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
1. Complete installation and startup checks according to manufacturer's written instructions.
  2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

1    3.4        ADJUSTING

2        A.    Adjust hardware and moving parts to function smoothly so that doors operate easily, free of  
3           warp, twist, or distortion.

4        B.    Lubricate bearings and sliding parts as recommended by manufacturer.

5        C.    Adjust doors and seals to provide weathertight fit around entire perimeter.

6        D.    Align and adjust motors, pulleys, belts, sprockets, chains, and controls according to  
7           manufacturer's written instructions.

8        E.    Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded  
9           galvanized surfaces and repair galvanizing to comply with ASTM A 780.

10    3.5        DEMONSTRATION

11        A.    Engage a factory-authorized service representative to train Owner's maintenance personnel to  
12           adjust, operate, and maintain sectional doors.

13    END OF SECTION 083613



SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior and interior storefront framing.
2. Storefront framing for window walls.
3. Storefront framing for punched openings.
4. Exterior and interior manual-swing entrance doors and door-frame units.

B. Related Sections:

1. Division 07 Section "Weather Barriers" for coordination of installation with waterproof underlayment flashing.
2. Division 08 Section "Sunshades" for premanufactured aluminum sunscreens installed by the window supplier.
3. Division 08 Section "Sliding Transaction Windows" for interior sliding window system.
4. Division 08 Section "Door Hardware" for cylinders provided under that Section for doors with locks under this Section.
5. Division 08 Section "Louvers and Vents" for units installed with aluminum-framed systems.

1.3 DEFINITIONS

- A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:

- a. Deflection exceeding specified limits.
  - b. Thermal stresses transferring to building structure.
  - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
  - d. Noise or vibration created by wind and by thermal and structural movements.
  - e. Loosening or weakening of fasteners, attachments, and other components.
  - f. Sealant failure.
  - g. Failure of operating units.
- B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Structural Loads:
1. Wind Loads: Per ASCE 7, for additional information see Structural Notes.
    - a. Basic Wind Speed: 85 mph (38 m/s).
    - b. Importance Factor:  $I = 1.15$ .
    - c. Exposure Category: C.
  2. Seismic Loads: As indicated on Structural Drawings and as required by authorities having jurisdiction.
- D. Deflection of Framing Members:
1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed  $L/175$  of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.
  2. Deflection Parallel to Glazing Plane: Limited to  $L/360$  of clear span or 1/8 inch (3.2 mm), whichever is smaller.
- E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
  2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.
- F. Story Drift: Provide aluminum-framed systems that accommodate design displacement of adjacent stories indicated.
1. Design Displacement: As indicated on Structural Drawings and as required by authorities having jurisdiction.
  2. Test Performance: Meet criteria for passing, based on building occupancy type, when tested according to AAMA 501.4 at design displacement and 1.5 times design displacement.

- 1 G. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed  
2 glazing and framing areas of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested  
3 according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft. (300  
4 Pa).
- 5 H. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not  
6 evidence water penetration through fixed glazing and framing areas when tested according to  
7 ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load  
8 design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- 9 1. Maximum Water Leakage: According to AAMA 501.1. Water leakage does not include  
10 water controlled by flashing and gutters that is drained to exterior and water that cannot  
11 damage adjacent materials or finishes.
- 12 I. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements  
13 resulting from the following maximum change (range) in ambient and surface temperatures.  
14 Base engineering calculation on surface temperatures of materials due to both solar heat gain  
15 and nighttime-sky heat loss.
- 16 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C),  
17 material surfaces.
- 18 J. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing  
19 areas having condensation-resistance factor (CRF) of not less than 45 when tested according to  
20 AAMA 1503.
- 21 K. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas  
22 having an average U-factor of not more than 0.40 Btu/sq. ft. x h x deg F (2.27W/sq. m x K)  
23 when tested according to AAMA 1503.
- 24 L. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain  
25 coefficient of no greater than 0.35 as determined according to NFRC 200.

26 1.5 ACTION SUBMITTALS

- 27 A. Product Data: For each type of product indicated. Include construction details, material  
28 descriptions, dimensions of individual components and profiles, and finishes for aluminum-  
29 framed systems.
- 30 B. Shop Drawings: For all aluminum-framed systems. Include plans, elevations, sections, details,  
31 and attachments to other work.
- 32 1. Include details of provisions for system expansion and contraction and for drainage of  
33 moisture in the system to the exterior.
- 34 2. For entrance doors, include hardware schedule and indicate operating hardware types,  
35 functions, quantities, and locations.
- 36 C. Samples for Initial Selection: For units with factory-applied color finishes.

- 1 D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard  
2 sizes.
- 3 E. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems,  
4 made from 12-inch (300-mm) lengths of full-size components and showing details of the  
5 following:
- 6 1. Joinery, including concealed welds.  
7 2. Anchorage.  
8 3. Expansion provisions.  
9 4. Glazing.  
10 5. Flashing and drainage.
- 11 F. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with  
12 performance requirements and design criteria, including analysis data signed and sealed by the  
13 qualified professional engineer responsible for their preparation, licensed in State of  
14 Washington.
- 15 1. Detail fabrication and assembly of aluminum-framed systems.  
16 2. Include design calculations.

17 1.6 INFORMATIONAL SUBMITTALS

- 18 A. Qualification Data: For qualified Installer.
- 19 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
20 America requirements.
- 21 C. Seismic Qualification Certificates: For aluminum-framed systems, accessories, and  
22 components, from manufacturer.
- 23 1. Basis for Certification: Indicate whether withstand certification is based on actual test of  
24 assembled components or on calculation.
- 25 D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified  
26 testing agency, for aluminum-framed systems, indicating compliance with performance  
27 requirements.
- 28 E. Source quality-control reports.
- 29 F. Field quality-control reports.
- 30 G. Warranties: Sample of special warranties.

31 1.7 CLOSEOUT SUBMITTALS

- 32 A. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
  - 1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- D. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines[and ICC/ANSI A117.1 and the current requirements of the International Building Code, as amended by the State of Washington, and adopted by the local jurisdiction.
- E. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
- F. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant
- G. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical wall area as approved by the Architect.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- H. Preinstallation Conference: Conduct conference at Project site.

1.9 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.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures including, but not limited to, excessive deflection.
- b. Noise or vibration caused by thermal movements.
- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- d. Water leakage through fixed glazing and framing areas.
- e. Failure of operating components.

2. Warranty Period: Ten (10) years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

1.11 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS – STOREFRONT SYSTEMS

A. Basis-of-Design Product – window system: The exterior aluminum-framed system is based on EFCO model "433" at the building exterior, as illustrated on the drawings. Doors are based on EFCO "Series D202 - Narrow Stile".

B. Basis-of-Design Product – window system: The exterior aluminum-framed system is based on EFCO model "325x" at the building exterior, as illustrated on the drawings.

C. Other approved manufacturers.

1. Kawneer North America; an Alcoa company.
2. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

D. Manufacturer: In addition to requirements above and herein, the manufacturer shall be the same as the manufacturer of products furnished under Division 8 Section “Glazed Aluminum Curtain Walls”.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken, as indicated by the basis of design products.
2. Glazing System: Retained mechanically with gaskets on four sides
3. Glazing Plane: As indicated.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing match framing system.

D. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

~~E.~~ Exposed Flashing:—To be provided under Division 07 Section “Sheet Metal Flashing and Trim”, unless specifically noted otherwise on drawings.

F. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

1. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.4 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

1. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.

a. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.5 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 2-inch (50.8-mm) overall thickness, with minimum 0.188-inch- (4.8-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

2. Door Design: Narrow stile; 2 ¼-inch (57.15-mm) nominal width. Bottom panel of the height as shown on the door schedule.

a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.



3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.

a. Provide non-removable glazing stops on outside of door.

B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

C. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.40 Btu/sq. ft. x h x deg F (2.27W/sq. m x K) when tested according to AAMA 1503.

## 2.6 OPERABLE UNITS

A. Operable Window Units in Storefront: Provide outward swinging (top hinged) awning style vent units and inward swinging (bottom hinged) hopper style vent units at locations indicated on drawings. Where sill of unit is more than 5 foot above finish floor, provide hardware and operating pole, one per room. Basis-Of-Design; EFCO "WV 410" series windows in "433" frames or "325x" operable units. Provide with manufacturer's full hardware, weather stripping, operation hardware, and finish to match curtain wall finish.

1. Operator: Push/pull type. Provide with pole operator where operator is 6 foot above finish floor or higher, with one pole per room with such vents.
2. Hinges: Manufacturer's standard for specified system.
3. Lock: Manufacturer's standard.
4. Limit Device: Concealed friction adjustor, adjustable stay bar or support arms with adjustable, limited, hold-open limit device; located on jamb of each ventilator. Limit to 4 inches of clear vent area at bottom of awning units and top of hopper units.
5. Glazing: Structurally siliconed glazing (SSG Version) glazed full perimeter.

## 2.7 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

1. Type and Location: Full, inside for project-out and full, outside for project-in sashes.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.

C. Aluminum Wire Fabric: 18-by-16 (1.1-by-1.3-mm) mesh of 0.011-inch- (0.28-mm-) diameter, coated aluminum wire.

1. Wire-Fabric Finish: As selected by the Architect from the manufacturer's full range of available colors.

2.8 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

1. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil (0.762-mm) thickness per coat.

C. Waterproof Underlayment Flashing: Provide waterproof underlayment flashing as specified in Division 7 Section "Weather Barriers", to coordinate with storefront installation process.

2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from interior or exterior as is standard for the system specified. Where an option exists, reglaze from interior.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

## 2.10 ALUMINUM FINISHES

- A. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: See Color Schedule on the drawings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 INSTALLATION

- A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure non-movement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight unless otherwise indicated.

- B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

- D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.
- E. Install flashing as detailed and in compliance with the requirements of Division 7 Section "Sheet Metal Flashing and Trim".
- F. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
- G. Install glazing as specified in Division 08 Section "Glazing."
- H. Coordinate installation of waterproof underlayment flashing with Division 7 Section "Weather Barriers". Provide waterproof underlayment flashing as specified in that section under this section if required to coordinate with storefront installation process.
- I. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
  - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
  - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- J. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

### 3.3 ERECTION TOLERANCES

- A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
  - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
  - 2. Alignment:
    - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
    - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
- B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections.
- B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive phases as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.

1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under "Performance Requirements" Article, but not more than 0.09 cfm/sq. ft. (0.03 L/s per sq. m), of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).
2. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under "Performance Requirements" Article, but not less than 4.18 lbf/sq. ft. (200 Pa), and shall not evidence water penetration.
3. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet (23 m) by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

C. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

E. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports.

G. Additional testing and inspecting will be performed to determine compliance of replaced or additional work with the specified requirements. All additional testing resulting from failed tests will be completed at the Contractor's expense, including the testing agency, Owner and Architect.

### 3.5 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches (75 mm) from the latch, measured to the leading door edge.

END OF SECTION 084113



1 SECTION 085653 – SLIDING TRANSACTION WINDOWS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Sliding, transaction windows.

- 9 B. Related Requirements:

- 10 1. Division 8 Section “Glazing”.

11 1.3 COORDINATION

- 12 A. Coordinate installation of anchorages for transaction windows. Furnish setting drawings,  
13 templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor  
14 bolts, and items with integral anchors, that are to be embedded in adjacent construction. Deliver  
15 such items to Project site in time for installation.

16 1.4 ACTION SUBMITTALS

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

- 18 1. Include construction details, material descriptions, dimensions of individual components  
19 and profiles, and finishes for window units.

- 20 B. Shop Drawings: For transaction windows.

- 21 1. Include plans, elevations, sections, and attachments to other work.  
22 2. Full-size section details of framing members, including internal armoring, reinforcement,  
23 and stiffeners.  
24 3. Hardware for sliding window units.  
25 4. Glazing details.

- 26 C. Samples for Initial Selection: For frame members with factory-applied color finishes.

27

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Framing: 6-inch- (153-mm-) long sections of frame members.

#### 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Pack transaction windows in wood crates for shipment. Crate glazing separate from frames unless factory glazed.

B. Label transaction window packaging with drawing designation.

C. Store crated transaction windows on raised blocks to prevent moisture damage.

#### 1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace transaction windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including deflections exceeding 1/4 inch (6 mm).

b. Failure of welds.

c. Faulty operation of sliding window hardware.

d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Two (2) years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 FRAMED SLIDING, TRANSACTION WINDOWS

A. Provide horizontal-sliding, transaction windows.



1. Basis-of-Design Product: Subject to compliance with requirements, provide C. R. Laurence Company, Inc., Model SW2212K:

a. Or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

B. Configuration: One fixed-glazed panel and one horizontal-sliding glazed panel.

C. Framing: Fabricate perimeter framing, mullions, and glazing stops from 6063-T5 extruded aluminum.

D. Sliding Window Hardware: Provide roller track designed for overhead support of two- or four-wheel carriage supporting horizontal-sliding glazed panel. Provide manufacturer's standard pull and lock with two keys for each horizontal-sliding glazed panel.

E. Glazing and Glazing Materials: Comply with requirements in Section 088000 "Glazing."

1. Thickness: ½" insulated glazing.

## 2.2 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.3 ALUMINUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range, see Color Schedule on Drawings.

## 2.4 ACCESSORIES

A. Miscellaneous Glazing Materials: Provide material, size, and shape complying with requirements of glass manufacturers and with a proven record of compatibility with surfaces contacted in installation.

1. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.

2. Setting Blocks: Elastomeric material with a Type A Shore durometer hardness of 85, plus or minus 5.
  3. Spacers: Elastomeric blocks or continuous extrusions with a Type A Shore durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
  4. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- B. Anchors, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, complying with ASTM B 633; provide sufficient strength to withstand design pressures indicated.
- C. Sealants: For sealants required within fabricated transaction windows, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of transaction windows.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of transaction window connections before transaction window installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing transaction windows to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.
- B. Removable Glazing Stops and Trim: Fasten components with security fasteners.
- C. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.
  1. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction unless otherwise indicated.
  2. Seal frame perimeter with sealant to provide weathertight construction unless otherwise indicated.
- D. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.3 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

3.4 ADJUSTING

- A. Adjust horizontal-sliding, transaction windows to provide a tight fit at contact points for smooth operation and a secure enclosure.
- B. Remove and replace defective work, including transaction windows that are warped, bowed, or otherwise unacceptable.

3.5 CLEANING AND PROTECTION

- A. Clean surfaces promptly after installation of transaction windows. Take care to avoid damaging the finish. Remove excess glazing and sealant compounds, dirt, and other substances.
  - 1. Lubricate sliding transaction window hardware.
- B. Provide temporary protection to ensure that transaction windows are without damage at time of Substantial Completion.

END OF SECTION 085653



1 SECTION 086200 - UNIT SKYLIGHTS (Alternated Bid)

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Acrylic dome skylights as required for a complete and weathertight installation.

- 9 B. Related Requirements:

- 10 1. Division 13 Section "Metal Building Systems" for metal roofing as part of complete  
11 weathertight roof envelope system provided as part of the metal building system.

12 1.3 REFERENCES

- 13 A. American Architectural and Manufacturers Association

- 14 1. AAMA/WDMA/CSA/101/I.S. 2/A440-05 North American Fenestration  
15 Standard/Specification for windows, doors, and skylights. (includes standard test methods  
16 for air infiltration, water penetration, structural loading)

- 17 2. AAMA 603.8-92 Pigmented Organic Coating on Extruded Aluminum

- 18 3. AAMA 611 - Voluntary Standards for Anodized Architectural Aluminum

- 19 4. ASTM A 193 / A 193M - 08b Standard Specification for Alloy-Steel and Stainless Steel  
20 Bolting Materials for High Temperature or High Pressure Service and Other Special  
21 Purpose Applications\

- 22 B. American Standards and Test Methods

- 23 1. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and  
24 Plate

- 25 2. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded  
26 Profiles

- 27 3. ASTM D 1667 - 05 Standard Specification for Flexible Cellular Materials - (Closed-Cell  
28 Foam)

C. International Building Code 2012

1.4 DESIGN REQUIREMENTS

- A. Unit skylights are certified by National Accreditation & Management Institute and rated by the National Fenestration Rating Council (NFRC) for thermal performance.

1. Clear Acrylic Skylight(s)

- a. U-Factor: 0.50
- b. SHGC: 0.57
- c. VT: 0.63

- B. Unit skylights are certified by National Accreditation & Management Institute to North American Fenestration Standard/Specification NAFS for air and water penetration and structural loading.

1.5 PREINSTALLATION MEETINGS

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

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of unit skylight.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for unit skylights.

- B. Shop Drawings: For unit skylight work.

1. Submit full scale shop drawings indicating methods of construction, location and spacing of anchorage, joinery, finishes, size, shape, thickness of framing members, flashing, relationship to adjoining work and glazing materials used.

- C. Aluminum Finish Samples: For each type of exposed finish required, in a representative section of each unit skylight in manufacturer's standard size.

- D. Glazing Samples: For each color and finish of glazing indicated, 12 inches (300 mm) square and of same thickness indicated for the final Work.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and manufacturer.

- B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

- C. Product Test Reports: For each type and size of unit skylight, for tests performed within the last four years by a qualified testing agency. Test results based on testing of smaller unit skylights than specified will not be accepted.
- D. Field quality-control reports.
- E. Sample Warranty: For special warranty.

## 1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For unit skylights to include in maintenance manuals.

## 1.9 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating unit skylights that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- B. Installer Qualifications: An installer acceptable to unit skylight manufacturer for installation of units required for this Project.

## 1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Uncontrolled water leakage.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - c. Yellowing of acrylic glazing.
    - d. Breakage of polycarbonate glazing.
    - e. Deterioration of insulating-glass hermetic seal.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following: CrystaLite, Inc., 3307 Cedar Street, Everett, WA 98201, 1-800-666-6065, [www.crystaliteinc.com](http://www.crystaliteinc.com) or approved substitute during the bid process per Instructions to Bidders and Specification Section 012500.

2.2 UNIT SKYLIGHTS

- A. General: Provide factory-assembled unit skylights that include extruded-aluminum glazing retainers, gaskets, and inner frames and that are capable of withstanding performance requirements indicated.
- B. Unit Size: As indicated on Drawings.
- C. Aluminum extruded components shall be alloy 6063-T5 or 6063-T6, of sufficient thickness for this application, and as required per structural calculations; ASTM B 221.
- D. Aluminum sheet and plate shall be alloy 5052-H32 per ASTM B 209.
- E. Acrylic Sheet
  - 1. "Plaskolite Optix White Acrylic Sheet"
    - a. Shape/Type: Triple domed
    - b. Color: Clear
    - c. Haze Value: Greater than 90%
    - d. Class: CC2 Fire Rating

2.3 ACCESSORY MATERIALS

- A. Fasteners: Same metal as metal being fastened, nonmagnetic stainless steel, or other noncorrosive metal as recommended by manufacturer. Finish exposed fasteners to match material being fastened.
  - 1. Exterior fasteners and fasteners exposed to wet areas in frame shall be 300 series stainless steel per ASTM 193/A 193M, except pop rivets used on glazing cap are aluminum or stainless steel per manufacturer
  - 2. Dry area fasteners shall be cadmium-plated steel per ASTM F 1135 or stainless steel.
  - 3. All welding shall be by the TIG process. All exposed welds to be finished to match frame color where practical.
- B. Glazing Accessories:
  - 1. Glazing tapes per ASTM D 1667, 2240, 3575. All other gaskets, setting blocks, and other materials used in glazing shall be of a type, quality and compatibility to provide performance of the skylight(s) covered in this section.
  - 2. Silicone sealant per CAN/CGSB 19.13-M87; TT-S-001543A/ASTM C 920, Type S, NS, Class 25 use NT, G, A&O test requirements.
- C. Insulated Self-Flashing Curb
  - 1. Skylight shall be mounted on a 9 or 12 inch tall, self-flashing aluminum curb, insulated with Thermasheath wall insulation.



- 1 D. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film  
2 thickness per coat.

3 2.4 ALUMINUM FINISHES

- 4 A. Class II color anodic finish per AA\_M12C22A32/A34 complying with AAMA 611. Mechanical  
5 finish non-specular as fabricated. Chemical finish etched medium matte. Anodic coating  
6 architectural Class II integrally colored or electrolytically deposited color coating 0.4 mil or  
7 thicker.

8 2.5 FABRICATION

- 9 A. Skylight(s) shall be factory fabricated and preassembled in largest size assemblies possible with  
10 considerations for shipping and jobsite handling.  
11 B. Skylight(s) shall have properly designed weep systems for drainage to exterior.

12 PART 3 - EXECUTION

13 3.1 EXAMINATION

- 14 A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer  
15 present, for compliance with requirements for installation tolerances and other conditions  
16 affecting performance of the Work.  
17 B. Proceed with installation only after unsatisfactory conditions have been corrected.

18 3.2 INSTALLATION

- 19 A. Framing shall be installed and glazed by experienced workmen in accordance with the approved  
20 shop drawings, manufacturer's instructions and glazing standards.  
21 B. Coordinate installation of unit skylight with installation of substrates, vapor retarders, roof  
22 insulation, roofing membrane, and flashing as required to ensure that each element of the Work  
23 performs properly and that combined elements are waterproof and weathertight.  
24 C. Comply with recommendations in AAMA 1607 and with manufacturer's written instructions for  
25 installing unit skylights.  
26 D. Install unit skylights level, plumb, and true to line, without distortion.  
27 E. Anchor unit skylights securely to supporting substrates.  
28 F. Where aluminum surfaces of unit skylights will contact another metal or corrosive substrates,  
29 such as preservative-treated wood, apply bituminous coating on concealed metal surfaces or  
30 provide other approved permanent separation recommended in writing by unit skylight  
31 manufacturer.

1    3.3        FIELD QUALITY CONTROL

- 2        A.    Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- 3        B.    After completion of installation and nominal curing of sealant and glazing compounds but  
4           before installation of interior finishes, test for water leaks according to AAMA 501.2.
- 5        C.    Perform test for total area of each unit skylight.
- 6        D.    Work will be considered defective if it does not pass tests and inspections.
- 7        E.    Additional testing and inspections, at Contractor's expense, will be performed to determine  
8           compliance of replaced or additional work with specified requirements.
- 9        F.    Prepare test and inspection reports.

10    3.4        CLEANING

- 11       A.    Clean exposed unit skylight surfaces according to manufacturer's written instructions. No  
12           abrasive materials of any kind shall be used in cleaning of skylight surfaces. Touch up  
13           damaged metal coatings and finishes.
- 14       B.    Remove excess sealants, glazing materials, dirt, and other substances.
- 15       C.    Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged  
16           during construction period.
- 17       D.    Protect unit skylight surfaces from contact with contaminating substances resulting from  
18           construction operations.

19    END OF SECTION 086200

1 SECTION 087100 – DOOR HARDWARE

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of Contract, including General and Supplementary Conditions  
5 and Division 01 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section includes:

- 8 1. Provide complete door hardware and suitable fastenings for the Project in accordance  
9 with Drawings, Specifications, and Schedules.  
10 2. Furnishing items of proper design for use on doors and frames of the size, thicknesses,  
11 profile, swing, security and similar requirements indicated, as necessary for proper  
12 installation and function.  
13 a. Provide UL Listed systems for exit doors.  
14 b. Provide UL Listed systems for fire rated doors where scheduled.  
15 c. Provide similar systems on non-latching doors where scheduled.  
16 3. Furnishing items not specifically mentioned, but necessary to complete the work. These  
17 are to match quality and finish of the items specified.

- 18 B. Quantities: Those listed in any instance are for subcontractor's convenience only and are not  
19 guaranteed.

20 C. Related Sections:

- 21 1. Division 1 Section "Alternates" for Alternate Bid Items that will impact the work of this  
22 Section.  
23 2. Division 08 Section "Hollow Metal Doors and Frames"  
24 3. Division 08 Section "Flush Wood Doors"  
25 4. Division 08 Section "Aluminum-Framed Entrances and Storefronts"  
26 5. Division 08 Section "Access Doors and Frames"  
27 6. Division 08 Section "Overhead Coiling Doors"

28 1.3 REFERENCES

29 A. Standards: Current edition at date of bid.

- 30 1. ADAAG - Americans with Disabilities Act, "Accessibility Guidelines for Buildings and  
31 Facilities"  
32 2. ANSI/BHMA A156.18 - Materials and Finishes  
33 3. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities  
34 4. Underwriters Laboratories - Building Materials Directory

B. Codes

1. 2009 International Building Code
2. Chapter 51-50 WAC Washington State Building Code

1.4 SUBMITTALS

A. General Requirements: All Submittals shall be in accordance with Sections 002100, "Instructions to Bidders" and 012500, "Submittal Procedures."

B. Product Data: Submit Six (6) copies of manufacturer's data for each item of finish hardware

C. Hardware Schedule: Submit Six (6) copies of a detailed Door Hardware Schedule.

1. The submitted Door Hardware Schedule shall indicate the complete designation of every item required for each door or opening.
2. Furnish cover sheet listing title of project as shown on the Contract Documents, address, phone and fax numbers of Owner, Contractor, and Supplier, name of Certified Hardware Consultant, and date of submittal.
3. List each opening individually under separate headings, in the same order as the door schedule. Do not group like or similar doors under a single heading. Do not continue individual headings on separate pages.
4. Each heading shall indicate opening location, handing, degree of opening, door and frame size, type, fire rating, and material.
5. Indicate product manufacturer and incorporate cross-reference to symbols used in Article 2.3 Hardware Schedule.
6. Include an index indicating door number, heading, page number, and locking function of each opening.
7. Include a cross reference for any abbreviations or symbols used.
8. Schedules in coded or horizontal format are unacceptable.
9. Submittals not conforming to these requirements will be returned without review, for re-submittal. Following is an example of the required format:

1 Sgl. Door #104A – Corridor 102 from Waiting 104	RHR 90°
3-0 x 7-0 x 1-3/4" x 20 Minute x Type D	SC WD x HMF

1	Each Hinges	MC	TA2714 US26D (652) 4-1/2 x 4-1/2" NRP x 1/2MS
1	Lockset	SC	L9050B 630 RHR
1	Door Closer	LCN	4040XP-EDA Alum (689) x STB
1	Kick Plate	TI	B4EKP – 10 x 34 – US32D (630) x B4E x CTSK
1	Wall Stop	TR	1270CX US26D (626)
1	Set Gasket	PE	S88D – 17' per Set

D. Revisions: The Door Hardware Submittal shall be kept current throughout the project duration. All revisions incorporated shall be submitted in accordance with the above requirements. Submit only cover sheet and revised pages. All revisions shall clearly identify changes from previous submittal content.

E. Samples: If requested by the Architect, submit one (1) sample of each exposed hardware category, finished as required, and tagged with full description for coordination with the

hardware schedule. Samples will be reviewed, by the Architect, for design and finish only, compliance with other requirements is the responsibility of the Contractor. Units which are acceptable and remain undamaged through submittal procedures may be used on the project.

F. Color Samples: Submit Six (6) set of color charts and physical samples of each product requiring color selection.

G. Key Schedule: Upon completion of the Key meeting indicated under sub-paragraph 2.3 C., submit Four (4) copies of a key schedule indicating the complete project key system for approval. Obtain approval prior to proceeding with lock portion of the project.

H. Operations and Maintenance Data. Prior to substantial completion, furnish two (2) copies of Maintenance and Operations Manuals, furnished in a clearly marked, tabbed, 3-ringed binder. Manuals shall contain final copy of the Finish Hardware Submittal, Product Data, Key Schedule, Installation Instructions, and Warrantees.

I. Certifications: Provide certification that steel components are provided in compliance with "Buy America Requirements."

#### 1.5 QUALITY ASSURANCE

A. Supplier:

1. Recognized door hardware supplier who has been furnishing hardware in the same area as the project for a period of not less than five (5) years.
2. Factory direct, authorized, and stocking distributor of the Exit Devices, Locksets and Door Closers.
3. Employ an Architectural Hardware Consultant (AHC), certified by the Door and Hardware Institute, who is available during the course of the work to meet with the Owner, Architect or Contractor for project hardware consultation.

B. Source: Obtain each kind of Hardware (Butts, Locksets, Exit Devices, Door Closers, etc.) from only one manufacturer.

C. Installer: Finish hardware shall be installed only by experienced tradesmen in compliance with trade union jurisdictions, either at the door and frame fabrication plant or at the project site.

D. Automatic Operators:

1. Automatic Operator Installer: The Operators and Accessories shall be installed by factory authorized and trained personnel, certified by American Association of Automatic Door Manufacturers (AAADM).
2. Pre-installation Conference: Prior to commencement of electrical work, provide for local factory representatives of the Automatic Operators to attend a pre-installation conference to review rough in and installation requirements with representatives of the General Contractor, Electrical Contractor, Finish Hardware Supplier, Automatic Operator and Finish Hardware Installers.
3. Certificates: Prior to substantial completion, provide certification from the local representative of the Automatic Operators that Operator applications are installed in

accordance with manufacturer recommendations. Submit certification in writing to the Owner in care of the Architect

E. Templates: Furnish hardware templates for each fabricator of doors, frames and other work to be factory prepared for the installation of hardware. Upon request, check the shop drawings of such other work to confirm that provisions will be made for the proper installation of hardware.

F. Regulatory Requirements:

1. All finish hardware shall comply with applicable local and/or state current building codes. All finish hardware shall meet the requirements of ADAAG, and ICC/ANSI A117.1 – Accessible and Usable Building and Facilities.
2. Provide only hardware which has been tested and listed by recognized testing agency for the types and sizes of doors required, and which complies with the requirements of the door and door frame labels. Provide Door Closers, Automatic self latching bolts, coordinators, gasketing, astragals, or other components if required to conform to label requirements.

#### 1.6 PRODUCT HANDLING AND STORAGE

A. Packaging: Each item or package is to be separately tagged with identification related to the final hardware schedule. Basic installation instructions shall be included in the packages.

B. Storage: Provide a locked room at the jobsite for the storage of the hardware.

#### 1.7 WARRANTY

A. Finish hardware shall be guaranteed against defects in workmanship and operation for a period of one (1) year, backed by a factory guarantee of the hardware manufacturer. The following products shall be guaranteed for periods beyond one year:

1. Locks – two years
2. Door Closers – ten years
3. Panic Devices – three years

#### 1.8 MAINTENANCE

A. Furnish one set of special tools required for installation and adjustment which shall be delivered directly to the Owner prior to substantial completion, in accordance with Section 01700, Project Close Out.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

A. Products may be furnished by the manufacturers listed under “As Specified” below, or equivalent products of type, grade, design, and function from manufacturers listed under

“Acceptable Substitutions”. Requests for products not listed must be made in accordance with Division 01 Section “Product Requirements”.

Product	As Specified	Acceptable Substitutions
Butt Hinges	McKinney (MC)	Bommer, Hager
Continuous Gear Hinges	Pemko (PE)	ABH, Select
Locksets and Latchsets	Schlage (SC)	Best, Sargent
Cylinders	Schlage (SC)	Best, Sargent
Exit Devices	Von Duprin (VO)	Precision, Sargent
Automatic Flush Bolts	Ives (IV)	Door Controls, Rockwood
Coordinators (IV)	Ives (IV)	Door Controls, Rockwood
Door Closers	LCN (LCN)	Sargent, Norton
Automatic Operators	Record (RE)	Horton
Activation Switches	MS Sedco (MS)	Camden, Larco
Door Pulls	Trimco (TR)	None
Kick & Mop Plates	Tice (TI)	Rockwood, Trimco
Overhead Stop and Holders	Glynn Johnson (GJ)	ABH, Rixson
Weatherstrip & Thresholds	Pemko (PE)	National Guard, Reese

B. Finish: Finish in general shall be: US26D, Satin Chrome Plated, except:

1. Locksets, Exit Devices, Push Plates, Door Pulls, Overhead Stops, and Exterior Butts: US32D, Satin Stainless Steel (BHMA 630).
2. Interior Hinges: US26D, Satin Chrome plated over Steel Base (BHMA 652).
3. Door Closers and Removable Mullions: Sprayed Aluminum (BHMA 689).
4. Kick Plates: US32D Satin Stainless Steel (BHMA 630).
5. Smoke Gasketing: As Selected.
6. Threshold, Weatherstrip & Door Bottoms: As listed

C. Butts and Continuous Gear Hinges:

1. Quantity (per Leaf):
  - a. Door openings up to 60": two each.
  - b. Door openings 60 to 90": three each.
  - c. Doors over 90": Furnish one additional for each 30" increment or fraction thereof.
2. Sizes:
  - a. 1-3/4" Exterior & Vestibule Doors: 5 x 4-1/2"
  - b. 1-3/4" Interior Doors up to and including 36": 4-1/2 x 4-1/2"
  - c. 1-3/4" Interior Doors over 36" -- 5 x 4-1/2"
3. Width of Hinges shall be as required to clear projecting trim or other conditions to allow maximum degree of opening.
4. Hinges shall have Flat Button Tips.
5. Hinges shall have non-removable pins (NRP - Set Screw in Barrel).
6. Coordinate Continuous Gear Hinge type (Short Leaf Flush or Inset) with Door and Frame manufacturer.
7. For unusual size or weight doors, furnish type, size and quantity recommended by the hinge manufacturer.

D. Locksets and Cylinders

1. Furnish Lever Handle Locksets and Latches in 06L Design.
2. Backset: 2-3/4"
3. Cylinders:
  - a. Furnish Locksets and Cylinders capable of accepting "Small Format" Key Removable Interchangeable Cores.
  - b. Provide appropriate Cylinder Collars, Blocking Rings, and Cams are required for each application
4. Locksets and Latchsets shall be listed with Underwriters Laboratories for A label and lesser class doors.
5. Provide Knurled Levers at hazardous locations (i.e.: Mechanical, Electrical Rooms)
6. Provide Curved Lip Strikes with adequate projection to protect door trim.
7. Provide manufacturers standard wrought or plastic strike boxes.
8. Coordinate location, rough-in, and voltage requirements for Electronic Lock and Electric Strikes with electrical sub-contractor.

E. Panic Devices and Fire Exit Hardware

1. Furnish Sex Nuts and Bolts at Wood Composite and Mineral Core Door applications.
2. Provide UL listed Fire Exit Devices at rated openings.
3. Provide Exit Devices sized in accordance with the manufacturer manufacturers recommendations.
4. Removable Mullions: Provide Mullion Spacer Blocks for installation in narrow stop frames.
5. Provide Glass Bead Kits where interference with vision frames occurs.
6. Exit Device Lever Trim shall match design specified under 2.1 D.

F. Door Closers

1. Drop Plates: Furnish drop plates where doors have insufficient height top rails, or where Regular Arm Door Closers are used in conjunction with Concealed Overhead Stops.
2. Fluid: Furnish cold weather fluid, at exterior & vestibule doors. Furnish non-flammable fluid at fire rated openings in conformance with UL Test Standard 10C.
3. Spacer Blocks: Furnish Spacer Blocks and/or shoe supports where frame stop does not provide for adequate support for the parallel arm soffit shoe.
4. Special Mounting: Provide special closer mounting as required where interference with weatherstrip or sound seals occurs.

G. Automatic Door Operators and Accessories

1. General: Locate Wall Plate Actuators and Key Switch as noted in the Architectural Drawings or as directed by Architect.
2. Wiring: System Wiring shall be concealed in the Wall and Door Frame.
3. Wiring Diagrams: Submit Wiring Diagrams in accordance with paragraph 1.5.H.
4. Coordination: Coordinate Wiring requirements with Electrical Contractor.
5. Installer: Operators are to be installed by a Factory Authorized Contractor. General Contractor to include installation cost in base bid.



H. Kick, Mop, and Armor Plates

1. Kick Plates shall be applied to the push side of the Door, Mop Plate applied to the pull side.
2. Plates shall be beveled four edges (B4E) and countersunk for screws.
3. Height: Kick Plates 10", Mop Plates 6", Armor Plates 34".
4. Plates shall be furnished with width as required to provide 1/4" clearance at sides of doors, frame stops, weatherstrip, sound seals, or astragals.

I. Stops & Holders

1. Furnish Overhead Stop and Holders sized as recommended by manufacturer.
2. Furnish Overhead Stop and Holders with special shims, brackets, or special template mounting where required.
3. Where wall stops are not applicable, furnish floor stops 1215CKU Series, or Overhead Stops if required.

J. Thresholds

1. Furnish all Thresholds with 1/4" - 20 x 2" Flat Head Sleeve Anchors (FHSL14200).

K. Weatherstrip and Smoke Gasketing

1. Furnish weatherstrip and gaskets for complete perimeter of opening, including mullions, and astragals. Furnish weatherstrip at sill of Four (4) sided frames.
2. Rain Drips shall be full width of opening including frame faces.

L. Door Silencers

1. Furnish Rubber Door Silencers for openings not specified to have Gasketing or Weatherstrip.
2. Quantity: Furnish three (3) for each single door frame, and four (4) for each pair of door frames.
3. Type: Trimco 1229A.

2.2 KEYING

- A. Establish a new Master Key System for this project. All key operated products (Locksets, Cylinders, Deadlocks, etc.) specified under this Section shall be keyed to the new system.
- B. Construction Keying: Provide Construction Cores and Keys for all Locksets and Cylinders during the construction period. Plastic Construction Cores are unacceptable.
- C. Key Conference: The Finish Hardware Supplier shall meet with the Owner to prepare the permanent keying schedule. Submit Key Schedule for Approval in accordance with 1.4 H.
- D. All Permanent Cores and Keys shall be transmitted directly to the Owner, prior to substantial completion. The General Contractor shall remove the construction cores and install the permanent cores. All Construction Cores shall be returned to the Door Hardware Supplier.

- 1 E. Transmittal: All Permanent Cores and Keys shall be sent direct from the lock manufacturer via
- 2 Registered Mail, Return Receipt Requested, to the Owner. Construction Keys shall be sent to
- 3 the General Contractor.
- 4 F. Stamping: Stamp all Keys “Do not Duplicate” and with change designation as directed.
- 5 G. Key Quantities: Furnish the following Key quantities:
- 6 1. Six (6) Master Keys per Set
- 7 2. Four (4) change keys per Lockset or Cylinder
- 8 3. Six (6) Construction Keys
- 9 4. Two (2) Construction Control Keys
- 10 5. Two (2) Permanent Control Keys

## 11 2.3 HARDWARE GROUPS

### 12 HW-1

#### 13 Door #A100Aa

14	1	Continuous Hinge	PE	CFM__SLIHD1 or SLF__HD1 x CC-4 x SER
15	1	Exit Device	VO	35NL-OP
16	1	Rim Cylinder	SC	80-329
17	1	Electric Latch Retraction Mod.	ACSI	RE1550-35NL-OP-24VDC-AE
18	1	Power Supply	ACSI	1426-04-AO
19	1	Automatic Operator	RE	8100-PUSH x FWH
20	1	Activation Switch (Outside)	MS	59-HSS
21	1	Activation Switch (Vestibule)	MS	59V-HSS
22	1	Door Pull	TR	1191-4
23	1	Overhead Stop	GJ	100ADJ-S Series
24	1	Threshold	PE	As per detail
25	1	Door Sweep	PE	315CN
26		Head and Jamb Weatherstrip		By Door and Frame Manufacturer
27		Card Reader		By Division 28

### 28 HW- 2

#### 29 Door #A100Ab

30	1	Continuous Hinge	PE	CFM__SLIHD1 or SLF__HD1 x CC-4 x SER
31	1	Push Bar	VO	350
32	1	Automatic Operator	RE	8100-PUSH x FWH
33	1	Activation Switch (Lobby Side)	MS	59J-HSS
34	1	Door Pull	TR	1191-4
35	1	Wall Stop	TR	1270CX
36	1	Threshold	PE	As per detail

1		HW- 3		
2		Door #A100Ba		
3	1	Continuous Hinge	PE	CFM__SLIHD1 or SLF__HD1 x CC-4 x SER
4	1	Exit Device	VO	35NL-OP
5	1	Rim Cylinder	SC	80-329
6	1	Electric Latch Retraction Mod.	ACSI	RE1550-35NL-OP-24VDC-AE
7	1	Power Supply	ACSI	1406-04-AO
8	1	Door Closer	LCN	4040XP x Top Jamb Mounted
9	1	Drop Plate	LCN	4040-18G
10	1	Door Pull	TR	1191-4
11	1	Wall Stop	TR	1270CX
12		Card Reader		By Division 28
13		HW- 4		
14		Door #A101a		
15	1	Pocket Door Hardware	PE	PF28200A
16	1	Sliding Door Lock	AC	2001 SDL-3 x 7200ADA Thumb Turn
17	1	Mortise Cylinder	SC	80-303
18	2	Door Pulls	TR	1195-1
19		HW- 5		
20		Door #A102a		
21	3	Each Hinges	MC	T4A3786
22	1	Privacy Lock	SC	L9440
23	1	Occupancy Indicator	TI	A1
24	1	Electric Strike	HES	1006-HD
25	1	Power Supply	ACSI	1420
26	1	Automatic Operator	RE	8100-PULL
27	2	Activation Switches	MS	59-HSS
28	1	Kick Plate	TI	B4EKP
29	1	Mop Plate	TI	B4EMP
30	1	Wall Stop	TR	1270CX
31	3	Silencers		
32		HW-6		
33		Doors #A103a, A103b, A105a, A106a, A107a, A108a, A109a, A110a, A115a, A124a		
34	3	Each Hinges	MC	TA2714
35	1	Office Lockset	SC	L9050GD
36	1	Wall Stop	TR	1270CX
37	1	Set Gasket	PE	S88D

1		HW- 7		
2		Door #A104a		
3	3	Each Hinges	MC	TA2714
4	1	Communicating Lockset	SC	L9466GD
5	1	Wall Stop	TR	1270CX
6	1	Threshold	PE	14/1A x 4" Wide
7	1	Set Door Seals	PE	379CR
8	1	Automatic Door Bottom	PE	434ARL
9		HW-8		
10		Doors #A104Aa, A104Ca, A114a, A116a, A127a		
11	3	Each Hinges	MC	TA2714
12	1	Classroom Lockset	SC	L9070GD
13	1	Wall Stop	TR	1270CX
14	3	Silencers		
15		HW-9		
16		Door #A104b		
17	3	Each Hinges	MC	TA2714
18	1	Classroom Lockset	SC	L9070GD
19	1	Wall Stop	TR	1270CX
20	1	Threshold	PE	14/1A x 4" Wide
21	1	Set Door Seals	PE	379CR
22	1	Automatic Door Bottom	PE	434ARL
23		HW- 10		
24		Door #A104Ba		
25	1	Set Anchor Hinges	MC	TA794
26	1	Classroom Lockset	SC	L9070GD
27	1	Overhead Stop	GJ	90S Series
28	3	Silencers		

1		HW- 11		
2		Door #A113a		
3	3	Each Hinges	MC	TA2714
4	1	Latchset	SC	L9010
5	1	Door Closer	LCN	4040XP-EDA
6	1	Kick Plate	TI	B4EKP
7	1	Wall Stop	TR	1270CX
8	1	Set Gasket	PE	S88D
9		HW-12		
10		Door #A113b		
11	3	Each Hinges	MC	TA2714
12	1	Latchset	SC	L9010
13	1	Door Closer	LCN	4040XP-RA
14	1	Kick Plate	TI	B4EKP
15	1	Wall Stop	TR	1270CX
16	1	Threshold	PE	14/1A
17	1	Set Gasket	PE	S88D
18	1	Door Shoe	PE	222AV
19		HW-13		
20		Door #A117a		
21	3	Each Hinges	MC	TA2714
22	1	Storeroom Lockset	SC	L9080GD
23	1	Door Closer	LCN	4040XP-EDA
24	1	Kick Plate	TI	B4EKP
25	1	Wall Stop	TR	1270CX
26	1	Set Gasket	PE	S88D
27		HW- 14		
28		Door #A119a, A119b		
29	1	Continuous Hinge	PE	CFM__SLIHD1 or SLF__HD1
30	1	Deadlatch	AR	4512 x 1-1/2" Backset
31	1	Mortise Cylinder	SC	80-303
32	1	Door Closer	LCN	4040XP x Top Jamb Mounted
33	1	Drop Plate	LCN	4040-18G
34	1	Overhead Stop	GJ	100S Series
35	1	Set Push/Pulls	TR	1738 x Type L & N Fasteners
36	1	Threshold	PE	As per detail
37	1	Door Sweep	PE	315CN
38		Head and Jamb Weatherstrip		By Door and Frame Manufacture

1		HW- 15		
2		Doors #A120a, A121a		
3	3	Each Hinges	MC	T4A3786
4	1	Push Plate	TR	1001-11
5	1	Pull Plate	TR	1014-3
6	1	Door Closer	LCN	4040XP-RA
7	1	Kick Plate	TI	B4EKP
8	1	Mop Plate	TI	B4EMP
9	1	Wall Stop	TR	1270CX
10	3	Silencers		
11		HW- 16		
12		Doors #A120Aa, A121Aa		
13	3	Each Hinges	MC	TA2714
14	1	Privacy Lock	SC	L9040
15	1	Occupancy Indicator	TI	A1
16	1	Door Closer	LCN	4040XP-RA
17	1	Overhead Stop	GJ	90S Series
18	1	Kick Plate	TI	B4EKP
19	1	Mop Plate	TI	B4EMP
20	3	Silencers		
21		HW- 17		
22		Door #A123a		
23	3	Each Hinges	MC	TA2714
24	1	Office Lockset	SC	L9050GD
25	1	Overhead Stop	GJ	410S Series
26	1	Set Gasket	PE	S88D
27		HW-18		
28		Door #A128a, A129a, A137b		
29	3	Each Hinges	MC	T4A3386
30	1	Entrance Lockset	SC	L9060GD
31	1	Door Closer	LCN	4040XP Spring-H-CUSH x ST1595
32	1	Kick Plate	TI	B4EKP
33	1	Threshold	PE	As per detail
34	1	Set Weatherstrip	PE	2891AS (Head) x 290AS (Jambs)
35	1	Door Sweep	PE	315CN

1		HW-19		
2		Door #A128b, A129b, A137a		
3		All Hardware by Door Manufacturer		
4		HW-20		
5		Door #A129c		
6	6	Each Hinges	MC	T4A3386
7	1	Entrance Lockset	SC	L9060GD
8	2	Flush Bolts	TR	3917 – 12”
9	1	Dust Proof Strike	TR	3911
10	1	Door Closer (Active Leaf)	LCN	4040XP Spring-H-CUSH x ST1595
11	1	Overhead Stop & Holder	GJ	90H Series
12	2	Armor Plates	TI	B4EAP
13	1	Threshold	PE	As per detail
14	1	Set Weatherstrip	PE	2891AS (Head) x 290AS (Jambs)
15	2	Door Sweeps	PE	315CN
16	1	Astragal	PE	357SP x S88D x TB
17		HW- 21		
18		Door #A130a		
19	8	Each Hinges	MC	TA2714
20	1	Classroom Lockset	SC	L9070GD
21	1	Flush Bolt (Top)	TR	3917 – 24”
22	1	Flush Bolt (Bottom)	TR	3917 – 12”
23	1	Dust Proof Strike	TR	3911
24	2	Armor Plates	TI	B4EAP
25	2	Wall Stop and Holders	TR	1260W
26	1	Astragal	PE	357SP x S88D x TB
27	4	Silencers		
28		HW- 22		
29		Door #A131a, A131b, A132a		
30	3	Each Hinges	MC	TA2714
31	1	Office Lockset	SC	L9050GD
32	1	Wall Stop	TR	1270CX
33	1	Threshold	PE	14/1A
34	1	Set Gasket	PE	S88D
35	1	Door Shoe	PE	222AV

1		HW-23		
2		Door #A133a		
3	3	Each Hinges	MC	TA2714
4	1	Privacy Lock	SC	L9040
5	1	Occupancy Indicator	TI	A1
6	1	Door Closer	LCN	4040XP-RA
7	1	Kick Plate	TI	B4EKP
8	1	Mop Plate	TI	B4EMP
9	1	Wall Stop	TR	1270CX
10	3	Silencers		
11		HW-24		
12		Door #A136a		
13	8	Each Hinges	MC	T4A3386
14	1	Entrance Lockset	SC	L9060GD
15	1	Flush Bolt (Top)	TR	3917 – 24”
16	1	Flush Bolt (Bottom)	TR	3917 – 12”
17	1	Dust Proof Strike	TR	3911
18	1	Door Closer (Active Leaf)	LCN	4040XP Spring-H-CUSH x ST1595
19	1	Overhead Stop & Holder	GJ	90H Series
20	2	Armor Plates	TI	B4EAP
21	1	Threshold	PE	As per detail
22	1	Set Weatherstrip	PE	2891AS (Head) x 290AS (Jambs)
23	2	Door Sweeps	PE	315CN
24	1	Astragal	PE	357SP x S88D x TB
25		HW- 25		
26		Door #A138b		
27	4	Each Hinges	MC	T4A3386
28	1	Exit Device	VO	LD98L x 996L-NL x Knurled Outside Lever
29	1	Rim Cylinder	SC	80-329
30	1	Door Closer	LCN	4040XP Spring-CUSH x ST1595
31	1	Kick Plate	TI	B4EKP
32	1	Threshold	PE	As per detail
33	1	Set Weatherstrip	PE	2891AS (Head) x 290AS (Jambs)
34	1	Door Sweep	PE	315CN



PART 3 - EXECUTION

3.1 PREPARATION

- A. Examination: Examine Doors, Frames, and related items for conditions that would prevent the proper application and operation of the Doors and Finish Hardware. Do not proceed until defects are corrected.
- B. Provide solid blocking for wall mounted components.
- C. Fasteners: Check all conditions and use fastening devices as needed to securely anchor all hardware as per manufacturer's published templates. Self-tapping sheet metal screws are not acceptable. Door Closers, Exit Devices, and Surface Mounted Overhead Stops shall be applied to wood composite and mineral core doors with Shoulder through bolts.

3.2 INSTALLATION

- A. Mounting Heights: Mount units at heights as recommended in "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames (2001)" by Doors and Hardware Institute, except as indicated below. Products not specifically covered shall be installed in accordance with the manufacturer templates and instructions.

1. Hinges:

- a. Top Hinge: 7-1/4", Top of frame rabbet to centerline of hinge.
- b. Bottom Hinge: 12-1/4", Bottom of Frame to centerline of hinge
- c. Intermediate Hinges: Centered, equal spacing between top and bottom hinges.

- B. Install each hardware item in compliance with manufacturer's instructions.

- 1. Cutting and Fitting: Wherever cutting and fitting are required to install hardware surfaces which will be painted or finished at a later time, install each item completely and then remove and store in a secure place. After completion of the finishes, re-install each item.
- 2. Door and Frame Finishes: Do not install surface-mounted items until finishes have been completed on the substrate.
- 3. Fire Rated Openings: Install in accordance with NFPA 80.
- 4. Doors shall swing to the maximum degree that project conditions will allow. The swings indicated on the floor plan are intended to depict direction and do not indicate full degree of opening.
- 5. Exit Devices: Trim Exit Devices to provide 1-1/2" clearance between End Cap and hinge jamb stop face and/or stop applied weatherstrip.
- 6. Door Closers: Door Closer shall be located to allow maximum degree of opening that project conditions will allow. Door Closer shall not be used to stop the door, except for models equipped with an integral stop-on-the-arm feature.
- 7. Overhead Stops: Furnish Overhead Stop and Holders with maximum degree of opening that project conditions will allow.
- 8. Floor Stops: Locate Floor Stops at maximum degree of opening that project conditions will allow. Do not locate Floor Stops where they create a hazardous condition. Stops should be located no more than 1/3 Door width from the latch edge of the Door.

9. Thresholds: Set all Exterior Thresholds in a bed of butyl rubber sealant in conformance with Division 07 requirements. Remove excess sealant. Caulk edges and joints to exclude moisture.
10. Weatherstrip: Mount and adjust Rigid Jamb Weatherstrip prior to mounting Parallel Arm Door Closers. Weatherstrip shall be installed to provide a continuous seal at head and jambs. Do not notch Weatherstrip for Door Closer shoe. Provide Parallel Arm 5th hole spacer of increased thickness to allow for revised location.
11. Mount Astragals on the pull side of active leaf our out-swinging applications, inactive leaf for in-swinging.
12. Smoke Gasket
  - a. Completely clean frame and apply gasket in accordance with manufacturer's instructions.
  - b. Mount Gasket to stop face of Strike Jambs and Headers, Door Rabbet of Hinge Jamb. If the Gasket is required to be mounted on the door rabbet of the Strike Jambs due to fire labeling requirements, provide Silencers.

- C. Adjust and check each operating item of hardware and each door to insure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.

### 3.3 ADJUSTMENT

- A. Final Adjustment: Wherever hardware installation is made more than one (1) month prior to acceptance or occupancy, make a final check and adjustment of all hardware items during the week prior to acceptance or occupancy. Clean and lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- B. Door Closer Adjustment: After mechanical systems have been balanced, adjust Door Closers to comply with following ICC/ANSI A117.1 - 2003 requirements, as modified by WAC 51-50 and the 2009 International Building Code:
  1. Closing Speed: Door Closers shall be adjusted so that from an open position of 90 degrees, the time required to move the door to an open position of 12 degrees shall be 5 seconds minimum.
  2. Opening Force: The maximum force for pushing or pulling a door open shall be as follows: (these forces do not apply to the force required to retract latch bolts or disengage other devices securing the door).
    - a. Fire Doors: The minimum opening force allowable by the appropriate administrative authority.
    - b. Exterior Doors: 10.0 lbf (44.4 N).
    - c. Interior Doors: 5.0 lbf. (22.2 N.)
  3. Adjust backcheck to prevent damage to the closer, hardware, door and frame, and wall.
- C. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes.

END OF SECTION 087100

1 SECTION 088000 - GLAZING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes glazing for the following products and applications, including those specified  
8 in other Sections where glazing requirements are specified by reference to this Section:

- 9 1. Windows.  
10 2. Doors  
11 3. Overhead sectional doors  
12 4. Glazed aluminum framed entrances and storefronts.  
13 5. Interior side lites.  
14 6. Sliding transaction windows  
15 7. Glass reception countertop  
16 8. Composite spandrel panels

17 B. Related Sections:

- 18 1. Division 8 Section "Aluminum Framed Entrances and Storefronts".  
19 2. Division 8 Section "Hollow Metal Doors and Frames"  
20 3. Division 8 Section "Sliding Transaction Windows"  
21 4. Division 8 Section "Overhead Sectional Doors"

22 1.3 DEFINITIONS

- 23 A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in  
24 referenced glazing publications.

- 25 B. Glass Thicknesses: Indicated by thickness designations in millimeters according to  
26 ASTM C 1036.

- 27 C. Interspace: Space between lites of an insulating-glass unit.

28 1.4 PERFORMANCE REQUIREMENTS

- 29 A. General: Installed glazing systems shall withstand normal thermal movement and wind and  
30 impact loads (where applicable) without failure, including loss or glass breakage attributable to  
31 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.

1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings, unless indicated otherwise on the drawings.

- a. Wind Design Data: As indicated on Drawings and as required to meet local loads.
- b. Wind Loads: Per ASCE 7, for additional information see Structural Notes
- c. Basic Wind Speed: 85 mph (38 m/s).
- d. Importance Factor:  $I = 1.15$ .
- e. Exposure Category: C.

2. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.

3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.

4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

## 1.5 ACTION SUBMITTALS

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

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

## 1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers and manufacturers of insulating-glass units with sputter-coated.

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for coated glass and insulating glass.

D. Warranties: Sample of special warranties.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Source Limitations for Glass: Obtain coated float glass, laminated glass and insulating glass from single source from single manufacturer for each glass type.
- D. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- E. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- F. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- H. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Install glazing in mockups specified in Division 08 Section "Aluminum-Framed Entrances and Storefronts" and "Glazed Aluminum Curtain Walls" to match glazing systems required for Project, including glazing methods.
- I. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Review temporary protection requirements for glazing during and after installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).

1.10 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Composite Panels: Manufacturer's form in which panel manufacturer agrees to replace composite panels that deteriorate within specified warranty period, including warpage, leakage, finish defects, or other indications of failure.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than ¼ inch.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article, but not less than minimum thickness noted above. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article, but not less than

minimum thickness noted above. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## 2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. For uncoated glass, comply with requirements for Condition A.
3. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Translucent Glass: ASTM C 1048, Condition B (spandrel glass, one surface ceramic coated), Type I (transparent flat glass), Quality-Q3, and complying with other requirements specified.

1. Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C 1048.

## 2.3 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
2. Spacer: Manufacturer's standard spacer material and construction..
3. Desiccant: Molecular sieve or silica gel, or blend of both.

## 2.4 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4. Thermoplastic polyolefin rubber complying with ASTM C 1115.

- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene, EPDM, silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

## 2.5 GLAZING SEALANTS

### A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Colors of Exposed Glazing Sealants: As indicated by manufacturer's designations.

- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Dow Corning Corporation; 790.
  - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
  - c. May National Associates, Inc.; Bondaflex Sil 290.
  - d. Pecora Corporation; 890.
  - e. Sika Corporation, Construction Products Division; SikaSil-C990.
  - f. Tremco Incorporated; Spectrem 1.

## 2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer



rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

## 2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

## 2.9 MONOLITHIC-GLASS TYPES

A. Uncoated Clear Float Glass: Where glass as designated below is indicated, provide Type I (transparent glass, flart), Class 1 (clear) glass lites complying with the following:

1. Uncoated Clear Annealed Float Glass – Scheduled as “F” on drawings: Annealed or Kind HS (heat strengthened), Condition A (uncoated surfaces) where heat strengthening is required to resist thermal stresses induced by differential shading of individual glass lites and to comply with performance requirements. Provide in ¼ inch thickness, unless noted otherwise.
2. Uncoated Clear Fully Tempered Float Glass – Scheduled as “T” on drawings: Kind FT (fully tempered). Provide in ¼ inch thickness, unless noted otherwise. Provide ½ inch thick where specifically noted.

B. Back-Painted Glass: Where glass as designated below is indicated, provide Type I (transparent glass, flart), Class 1 (clear) glass lites, back-painted, complying with the following:

1. Uncoated Clear Fully Tempered Float Glass, noted on the drawings as “Back Painted Back Splash”, or similar wording: Kind FT (fully tempered). Provide in ¼ inch thickness, back-painted as noted herein.
2. Exposed Edges: Polish smooth, no sharp edges.
3. Paint: “Opaci-Coat 300” by ICD High Performance Coatings to match custom color. Provide in dry film thickness as recommended by the manufacturer to meet fallout protection.
4. Installation: Install back-painted glass by adhering to wall substrate with an adhesive compatible with and recommended by the coating manufacturer.

## 2.10 MONOLITHIC TRANSLUCENT-GLASS UNITS

A. Interior Tempered Translucent-Glass Units – Scheduled as “TT” (Tempered Translucent) on drawings: Quality-Q 5, Finish F 1:

1. Basis-of-Design Product: Walker Glass; “Clear Satin”, or a comparable product by an approved manufacturer:
2. Pattern: Apply etching to surface number three.
  - a. Solid Translucent.
3. Class 1 (clear) glass.
4. Kind FT (fully tempered).
5. Thickness: ¼ inch, unless noted otherwise. Provide in ½ inch thickness where specifically noted.

2.11 INSULATING-GLASS TYPES

A. Insulating Glass: Where glass of this designation is indicated, provide insulating-glass units complying with the following:

1. Drawing Schedule Designations:

IF: Insulated / Float (interior pane) / Float (exterior pane).

IT: Insulated / Tempered (interior pane) / Tempered (exterior pane).

ITT: Insulated / Tempered (interior pane) / Translucent (exterior pane)

2. Overall Unit Thickness: 1 inch.

a. Exterior Units: 1/8" panes.

b. Interior (Insulating) 3/16" and 1/8" panes.

3. Indoor Lite:

a. Class 1 clear float glass, clear tempered glass, or clear laminated glass as scheduled on the Drawings. Provide glass types and thickness as specified herein.

4. Outdoor Lite:

a. Float glass, tempered glass, or laminated glass as scheduled on the Drawings. Provide glass types and thickness as specified herein. Glass shall be of the following type:

1) Class 1 clear glass, unless noted otherwise on drawings for the following types of glass.

2) Ceramic-Coated Vision Glass where noted on drawings "T" for translucent or noted as translucent. Glass type as noted herein above.

5. Low-E Insulating Glass: For all exterior insulating glass, provide low-emissivity insulating-glass units – Low-E magnetic sputter vacuum deposit coating. PPG Industries "SOLARBAN 60" LOW-E GLASS or AFG "Low-E2", or "CARDINAL LoE-178" or "GUARDIAN SN68" or approved substitute during the bid process, per Specification Sections 002100 and 012500. Low E coating shall be applied to surface number 2 at all insulating glass panels.

2.12 LAMINATED-GLASS TYPES

A. Laminated Glass – Scheduled as "L" on drawings at reception counter: Where glass of this designation is indicated, provide glass lites complying with the following:

1. Kind LA, consisting of two lites of annealed float glass. Total thickness of glass 1/4 inch.

2. Inner Lite: Type I (transparent glass, flat) float glass.

a. Class 1 (clear).

b. Thickness: 1/8 inch unless noted otherwise.

3. Outer Lite: Type I (transparent glass, flat) float glass.

- 1                   a.     Class 1 (clear)
- 2                   b.     Thickness: 1/8 inch unless noted otherwise.
- 3                 4.     Plastic Interlayer: 0.060 inch (1.52mm) thick.
- 4                   a.     Interlayer Color: Translucent.

5   2.13    COMPOSITE SPANDREL PANELS

- 6       A.    Spandrel Panels: Where composite spandrel panels are indicated, provide the following, or
- 7            approved substitute during the bid process per the Instructions to Bidders and Specification
- 8            Section 012500.
- 9            1.    “Mapes-R, Insulated Composite Panels.”
- 10           a.    Thickness: 1 inch.
- 11           b.    Finish: Custom Kynar finish to match interior accent color.
- 12           c.    Substrate: 1/8” hardboard or cement board as recommended by manufacturer.
- 13           d.    Core: Polystyrene.

14   PART 3 - EXECUTION

15   3.1    EXAMINATION

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

24   3.2    PREPARATION

- 25       A.    Clean glazing channels and other framing members receiving glass immediately before glazing.
- 26            Remove coatings not firmly bonded to substrates.
- 27       B.    Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so
- 28            that exterior and interior surfaces are readily identifiable. Do not use materials that will leave
- 29            visible marks in the completed work.

3.3 GLAZING, GENERAL

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

3.4 TAPE GLAZING

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

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 LOCK-STRIP GASKET GLAZING

- A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.8 CLEANING AND PROTECTION

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

END OF SECTION 088000





1 SECTION 089000 - LOUVERS AND VENTS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Fixed extruded-aluminum louvers, flashings and installation accessories.

- 9 B. Related Sections:

- 10 1. Division 7 Section "Weather Barriers" for coordination of installation with waterproof  
11 membrane flashing.  
12 2. Division 08 Section "Metal Wall Panels" for siding systems adjacent to louvers and  
13 vents.

14 1.3 DEFINITIONS

- 15 A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to  
16 this Section unless otherwise defined in this Section or in referenced standards.
- 17 B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.
- 18 C. Vertical Louver: Louver with vertical blades; i.e., the axes of the blades are vertical.
- 19 D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to  
20 channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- 21 E. Storm-Resistant Louver: Louver that provides specified wind-driven rain performance, as  
22 determined by testing according to AMCA 500-L.

23 1.4 PERFORMANCE REQUIREMENTS

- 24 A. Delegated Design: Design louvers, including comprehensive engineering analysis by a  
25 qualified professional engineer, using structural and seismic performance requirements and  
26 design criteria indicated.
- 27 B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following  
28 loads and stresses within limits and under conditions indicated without permanent deformation  
29 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 normal to the face of the building.

1. Wind Loads: Determine loads based on uniform pressure acting inward or outward, for 85 mph, exposure “C” conditions.

C. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. Design earthquake spectral response acceleration, short period (Sds) for Project is 0.821.
2. Component Importance Factor is 1.0.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

## 1.5 ACTION SUBMITTALS

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

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.
3. Wiring Diagrams: For power, signal, and control wiring for motorized adjustable louvers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of metal finish required.

E. Delegated-Design Submittal: For louvers indicated to comply with structural and seismic performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
- B. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
  2. AWS D1.3, "Structural Welding Code - Sheet Steel."
  3. AWS D1.6, "Structural Welding Code - Stainless Steel."
- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.
1. Use tamper resistant screws for exposed fasteners unless otherwise indicated.
  2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
  3. For color-finished louvers, use fasteners with heads that match color of louvers.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
  - 1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.
  - 2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.
- C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
  - 1. Frame Type: Type as referenced by the basis of design product.
- E. Include supports, anchorages, and accessories required for complete assembly.
- F. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less. If any deviations from spacing shown on the Drawings is required, send RFI to Architect through Contractor illustrating proposed changes. Do not proceed with fabrication without the Architect's written approval. Provide necessary revisions at no additional cost.
  - 1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
- G. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Drainable-Blade Louver:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Construction Specialties (C/S) Group, or comparable product by one of the following:
    - a. Airolite Company, LLC (The).
    - b. Construction Specialties, Inc.

- 1 c. Greenheck Fan Corporation.
- 2 d. Industrial Louvers, Inc.
- 3 e. Louvers & Dampers, Inc.; a division of Mestek, Inc.
- 4 f. Nystrom Building Products.
- 5 g. Or approved substitute during the bid process per the Instructions to Bidders and
- 6 Specification Section 012500.
- 7 2. Provide C/S Group Model A4080.
- 8 a. Louver depth: 4 inches (100 mm).
- 9 b. Minimum free area: 50 percent.
- 10 c. Provide insect screens.
- 11 d. Provide insulated blank-off panels with 1 inch panel, EPS core, 0.32 aluminum
- 12 face. Color to match aluminum frame.
- 13 e. Provide hinged panel as indicated on Drawings.
- 14 f. Provide deadbolt lock accessed from interior.
- 15 3. Other Requirements:
- 16 a. Frame and Blade Nominal Thickness: Not less than 0.080 inch (2.03 mm) for
- 17 blades and 0.080 inch (2.03 mm) for frames.
- 18 b. Mullion Type: Exposed.
- 19 c. Louver Performance Requirements: Provide louvers with performance results
- 20 equal to or exceeding the tested standards of the basis of design product in all
- 21 respects. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
- 22 e. Glazing Frame: Where louvers are indicated on the drawings to be in installed
- 23 aluminum-framed opening system, provide a 1 inch flush glazing frame adapter to
- 24 allow louver to be stopped into the aluminum framing system similar to glass.
- 25 2.4 LOUVER SCREENS
- 26 A. General: Provide screen at each exterior louver.
- 27 1. Screen Location for Fixed Louvers: Interior face.
- 28 2. Screening Type: Bird screening except where insect screening is indicated.
- 29 B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum
- 30 of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- 31 C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
- 32 1. Metal: Same kind and form of metal as indicated for louver to which screens are
- 33 attached.
- 34 2. Finish: Same finish as louver frames to which louver screens are attached.
- 35 3. Type: Rewirable frames with a driven spline or insert.
- 36 D. Louver Screening for Aluminum Louvers:
- 37 1. Bird Screening: Stainless steel, 1/2-inch- (13-mm-) square mesh, 0.047-inch (1.19-mm)
- 38 wire.

2.5 BLANK-OFF PANELS

A. Uninsulated, Blank-Off Panels: Metal sheet attached to back of louver.

1. Aluminum sheet for aluminum louvers, not less than 0.050-inch (1.27-mm) nominal thickness.
2. Panel Finish: Same type of finish applied to louvers, but black color.
3. Attach blank-off panels with sheet metal screws.

B. Insulated, Blank-Off Panels: Laminated panels consisting of insulating core surfaced on back and front with metal sheets and attached to back of louver.

1. Thickness: 2 inches (50 mm).
2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.81-mm) nominal thickness.
3. Insulating Core: extruded-polystyrene foam.
4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames, not less than 0.080-inch (2.03-mm) nominal thickness, with corners mitered and with same finish as panels.
5. Seal perimeter joints between panel faces and louver frames with gaskets or sealant.
6. Panel Finish: Same type of finish applied to louvers, but black color.
7. Attach blank-off panels with sheet metal screws.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.7 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

C. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: See Color Schedule on the drawings. The Architect reserves the right to change the listed color(s), and select from the manufacturer's full range of available colors or to select a custom color(s) at no additional charge.

1 PART 3 - EXECUTION

2 3.1 EXAMINATION

- 3 A. Examine substrates and openings, with Installer present, for compliance with requirements for  
4 installation tolerances and other conditions affecting performance.
- 5 B. Proceed with installation only after unsatisfactory conditions have been corrected.

6 3.2 PREPARATION

- 7 A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of  
8 anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery  
9 of such items to Project site.

10 3.3 INSTALLATION

- 11 A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- 12 B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where  
13 required to protect metal surfaces and to make a weathertight connection.
- 14 C. Form closely fitted joints with exposed connections accurately located and secured.
- 15 D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as  
16 indicated.
- 17 E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no  
18 evidence remains of corrective work. Return items that cannot be refinished in the field to the  
19 factory, make required alterations, and refinish entire unit or provide new units.
- 20 F. Protect unpainted galvanized and nonferrous-metal surfaces that will be in contact with  
21 concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy  
22 coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic  
23 flashing.
- 24 G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses,  
25 where weathertight louver joints are required. Comply with Division 07 Section "Joint  
26 Sealants" for sealants applied during louver installation.
- 27 H. Flash, waterproof and seal louver and vent openings similar to windows. See drawings for  
28 requirements.

29 3.4 ADJUSTING AND CLEANING

- 30 A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that  
31 comply with requirements.

- 1       B.    Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to  
2       remove fingerprints and soil during construction period. Do not let soil accumulate during  
3       construction period.
- 4       C.    Before final inspection, clean exposed surfaces with water and a mild soap or detergent not  
5       harmful to finishes. Thoroughly rinse surfaces and dry.
- 6       D.    Restore louvers and vents damaged during installation and construction so no evidence remains  
7       of corrective work. If results of restoration are unsuccessful, as determined by Architect,  
8       remove damaged units and replace with new units.
- 9       1.    Touch up minor abrasions in finishes with air-dried coating that matches color and gloss  
10      of, and is compatible with, factory-applied finish coating.
- 11    END OF SECTION 089000



1 089520 - SUNSHADES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes architectural aluminum sunshade devices connected to structural supports as  
8 shown on drawings and specified in this section.

9 B. Related Sections:

- 10 1. Division 5 Section “Metal Fabrications” and “Structural Steel” for structural framing  
11 supporting sunshades.

12 1.3 ACTION SUBMITTALS

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

- 14 B. Product finish samples, test reports, and warranties.

15 C. Shop Drawings:

- 16 1. Provide drawings showing full size details of all sunshade components including all  
17 anchors, sunshade supports, and building attachments.  
18 2. Engineering calculations documenting compliance with requirements of Section 1.5.

19 1.4 INFORMATIONAL SUBMITTALS

- 20 A. Qualification Data: For Manufacturer and Installer.

21 1.5 PERFORMANCE REQUIREMENTS

22 A. Structural Loads:

- 23 1. Wind Loads: Per ASCE 7, for additional information see Structural Notes.  
24 a. Basic Wind Speed: 85 mph (38 m/s).  
25 b. Importance Factor: I = 1.15.  
26 c. Exposure Category: C.

2. Seismic Loads: As indicated on Structural Drawings and as required by authorities having jurisdiction.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Manufacturer Qualifications: A firm experienced in manufacturing aluminum sunshades identical to the system specified herein.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum sunshade systems, indicating compliance with performance requirements.
- D. Source Limitations for Aluminum Sunshade Systems: Obtain from single source from single manufacturer.
- E. Mockups:
  1. Provide mock-up of sunshade section connected to steel support plate. The mock-up, if approved by the Architect, may become part of the permanent installation.
- F. Preinstallation Conference: Conduct conference at Project site.
  1. Require representatives of each entity directly concerned with sunshades to attend.

#### 1.7 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.

#### 1.8 WARRANTIES

- A. Material and Workmanship:
  1. Per AAMA standard 601, provide written guarantee against defects in material and workmanship.
  2. Warranty period shall be for three (3) years from the date of Substantial Completion.
  3. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.

1 PART 2 - PRODUCTS

2 2.1 MANUFACTURES

3 A. Basis of Design

- 4 1. EFCO “E-SHADE” Aluminum Sunshade.  
5 2. Or approved substitute during the bid process per the Instructions to Bidders and  
6 Specification Section 012500.

7 2.2 MATERIALS

8 A. Aluminum:

- 9 1. Extruded aluminum shall be 6063-T6 alloy and temper.

10 B. Dissimilar Metals:

- 11 1. All dissimilar metals must be properly insulated to prevent galvanic action.  
12 2. Provide nylon washers to separate aluminum from steel components as indicated on the  
13 Drawings.

14 C. Fasteners:

- 15 1. All exposed fasteners shall be aluminum, stainless steel, or zinc plated steel.

16 2.3 FABRICATION

17 A. General:

- 18 1. All aluminum horizontal extrusions (blades) shall have a minimum wall thickness of  
19 0.063" (1.5 mm) to 0.125" (3 mm).  
20 2. Sunshade “arms” and mullion clips shall be extrusions with a nominal wall thickness of  
21 0.25" (6 mm).

22 B. Sunshade Device:

- 23 1. Configuration: As detailed on Drawings.  
24 2. Horizontal components (blades) shall be mechanically fastened by means of extruded  
25 aluminum screw splines.

26 C. Finish:

- 27 1. Clear anodized

3 PART 3 - EXECUTION

4 3.1 INSPECTION

5 A. Job Conditions:

- 6 1. Ensure anchorage systems are complete, plumb, properly sealed for weather intrusion  
7 prior to installing sunshade. Do not proceed with installation until all deficiencies are  
8 corrected.  
9 2. Provide for manufacturer representation to conduct pre-installation site meeting.

10 3.2 INSTALLATION

11 A. Use only skilled tradesmen with work done in accordance with approved shop drawings and  
12 established specifications.

13 B. Ensure bolted connections are made secure. Provide certification from manufacturer that the  
14 installation is complete.

15 3.3 ANCHORAGE

16 A. Adequately anchor to maintain positions permanently when subjected to normal thermal  
17 movement, specified building movement, and specified wind loads.

18 3.4 PROTECTION AND CLEANING

19 A. The general contractor shall protect the aluminum materials and finish against damage from  
20 construction activities and harmful substances. The general contractor shall remove any  
21 protective coatings as directed by the Architect, and shall clean the aluminum surfaces as  
22 recommended for the type of finish applied.

23 END OF SECTION 089520

1 SECTION 092216 - NON-STRUCTURAL METAL FRAMING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Non-load-bearing steel framing systems for interior gypsum board assemblies.

- 9 B. Related Requirements:

- 10 1. Division 09 Section "Gypsum Board"

11 1.3 ACTION SUBMITTALS

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

- 13 B. Shop Drawings:

- 14 1. Provide floor plans and details that show layout, spacing, sizes, thicknesses, and types of  
15 metal framing, including fastening and anchorage details and mechanical fasteners. Show  
16 reinforcing channels, opening framing, supplemental framing, strapping, bracing,  
17 backing, bridging, blocking, splices, accessories, connection details, sill and head support  
18 for all interior relites and window systems, and attachment to adjoining work. Show  
19 locations, fabrication, and installation of control and expansion joints including plans,  
20 elevations, sections, details of components, and attachments to other units of Work.  
21 2. Provide "Backing Plans" consisting of floor plans that indicate location, type and gauge  
22 of material for all backing and blocking, including but not limited to backing for future  
23 wall mounted items, backing for casework, equipment, toilet partitions, drinking  
24 fountains, door stops, and other wall mounted equipment and accessories.  
25 3. All interior systems are bidder design. Provide stamped shop drawings by a structural  
26 engineer licensed in Washington State. See Structural General Notes and Structural  
27 Drawings for additional information.

28 1.4 INFORMATION SUBMITTALS

- 29 A. Evaluation Reports: For dimpled steel studs and runners and firestop tracks, from ICC-ES.

- 30 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
31 America requirements.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized, unless otherwise indicated.
- B. Studs and Runners: ASTM C 645.
  - 1. Steel Studs and Runners:
    - a. Minimum Base-Metal Thickness: 20 gauge minimum.
    - b. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide the following:
  - 1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
      - 2) MBA Building Supplies; FlatSteel Deflection Track.
      - 3) Steel Network Inc. (The); VertiClip SLD Series.
      - 4) Superior Metal Trim; Superior Flex Track System (SFT).
      - 5) Telling Industries; Vertical Slip Track.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
  - 1. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm) minimum, unless indicated otherwise.

E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm), unless indicated otherwise.
2. Depth: 7/8 inch (22.2 mm), unless indicated otherwise.

F. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Hat shaped, unless indicated otherwise.
2. mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following, unless indicated otherwise on the drawings:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), non-perforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

E. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4 wide spaces at sides of these locations, and 1 inch below at designated deflection joints (unless noted otherwise), and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

### 3.3 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.

1. Space studs as follows:

a. Single-Layer Application: 16 inches (406 mm) o.c. unless otherwise indicated.

b. Multilayer Application: 16 inches (406 mm) o.c. unless otherwise indicated.

c. Tile Backing Panels: 16 inches (406 mm) o.c. unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

a. Install two studs at each jamb unless otherwise indicated.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

D. Direct Furring:

1. Screw to metal framing, spaced 16 inches o.c., unless noted otherwise.

2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 16 inches o.c., unless noted otherwise.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.



1 F. Extend partition framing full height to structural supports or substrates above suspended  
2 ceilings, except where indicated otherwise. Continue framing over frames for doors and  
3 openings and frame around ducts penetrating partitions above ceiling to provide support for  
4 gypsum board.

- 5 1. Cut studs 1 inch (unless noted otherwise) short of full height to provide for structural  
6 deflection space. Provide top deflection track to accommodate structure deflection.  
7 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of  
8 floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings,  
9 install framing around structural and other members extending below floor/roof slabs and  
10 decks, as needed to support gypsum board closures and to make partitions continuous  
11 from floor to underside of solid structure.

12 G. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm)  
13 between the end of wall framing member and the web of track. Fasten both flanges of studs to  
14 top and bottom tracks.

15 END OF SECTION 092216  
16



1 SECTION 092900 - GYPSUM BOARD

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Interior gypsum board.  
9 2. Tile backing panels.  
10 3. Texture finishes.

11 B. Related Requirements:

- 12 1. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and  
13 suspension systems that support gypsum board panels.

14 1.3 ACTION SUBMITTALS

15 A. Product Data: For each type of product.

16 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
17 America requirements.

18 C. Samples: For the following products:

- 19 1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim  
20 accessory indicated.

21 1.4 QUALITY ASSURANCE

22 A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9  
23 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and  
24 execution.

25 1. Install mockups for the following:

- 26 a. Each level of gypsum board finish indicated for use in exposed locations.  
27 b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wall coverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging. Any gypsum or related materials that become wet or damaged shall be removed and replaced with new materials.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned. Maintain conditioning continuously once gypsum board installation begins through Substantial Completion, without interruption.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

#### 2.2 GYPSUM BOARD, GENERAL

- A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

- B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. Lafarge North America Inc.
5. National Gypsum Company.
6. PABCO Gypsum.
7. Temple-Inland.
8. USG Corporation.
9. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm), typical, unless specifically indicated otherwise on drawings.
2. Long Edges: Tapered.
3. Location: For all locations where gypsum wall board is indicated on the Drawings for fire rated and non-fire rated assemblies, except as noted herein.

- C. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M.

1. Type X:

- a. Thickness: 5/8 inch, typical, unless specifically indicated otherwise on drawings.
- b. Long Edges: Tapered.
- c. Location: For all Restrooms at non-tiled walls, at Locker Room walls, Mechanical Room walls, Fire Sprinkler Riser Room walls, at kitchen areas, Custodian's Room walls, walls in rooms subject to moisture, and where indicated on drawings.

2.4 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. CertainTeed Corp.; GlasRoc Tile Backer.
- b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
- c. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

- 1           2.     Core: 5/8 inch (15.9 mm), Type X.
- 2           3.     Mold Resistance: ASTM D 3273, score of 10.

3     2.5     TRIM ACCESSORIES

4         A.     Standard Interior Trim: ASTM C 1047.

- 5           1.     Manufacturers: Subject to compliance with requirements, provide products by any
- 6                 manufacturer meeting the requirements of this section for standard trim shapes.
- 7           2.     Material: Galvanized or aluminum-coated steel sheet, rolled zinc, or paper-faced
- 8                 galvanized steel sheet.
- 9           3.     Shapes:
  - 10           a.     Cornerbead.
  - 11           b.     LC-Bead: J-shaped; exposed long flange receives joint compound.
  - 12           c.     L-Bead: L-shaped; exposed long flange receives joint compound.
  - 13           d.     U-Bead: J-shaped; exposed short flange does not receive joint compound.
  - 14           e.     Pull-away Pre-mask L-Bead: Use at all windows storefront and curtain wall.
  - 15                 “Trim-Tex” “Pullaway” Pre-mask L-Bead or similar.
  - 16           f.     Expansion (control) joint.
  - 17           g.     “Z” Bead: Trim Tex AS 5810.
  - 18           h.     Reveal Bead: Trim Tex AS 5150.
  - 19           i.     Reveal Bead Crosspiece: Trim Tex AS 500 C, AS 500 T.
  - 20           j.     Flush Expansion Bead: Trim Tex Hideaway 2710.
  - 21           k.     Picture Tail: Fry Reglet Picture Rail DRMH-50 with DRMH-50 insert hangers.
  - 22                 Provide 1 hanger per 48 inches of track.

- 23         B.     Aluminum Trim: Provide standard and custom aluminum trim shapes where indicated on the
- 24                 drawings, and of the type indicated on the drawings. Provide in finish and color indicated on
- 25                 drawings, factory applied. Provide Fry Reglet, Gordon or approved substitute during the bid
- 26                 process per the Instructions to Bidders and Specification Section 012500.

27     2.6     JOINT TREATMENT MATERIALS

28         A.     General: Comply with ASTM C 475/C 475M.

29         B.     Joint Tape:

- 30           1.     Interior Gypsum Board: Paper.
- 31           2.     Tile Backing Panels: As recommended by panel manufacturer.

32         C.     Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible

33                 with other compounds applied on previous or for successive coats.

- 34           1.     Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas,
- 35                 use setting-type taping compound.
- 36           2.     Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and
- 37                 trim flanges, use setting-type taping compound.

- a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

- D. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- E. Insulation: As specified in Division 07 Section "Thermal Insulation."

- F. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except where indicated otherwise.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at sides of these locations and 1 inch below at designated deflection joints (unless noted otherwise), and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.



3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings.
2. Type X: At all locations.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect, and as indicated on Drawings.
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners unless otherwise indicated.
  - 2. LC-Bead: Use at exposed panel edges.
  - 3. L-Bead: Use where indicated.
  - 4. U-Bead: Use at exposed panel edges where indicated.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 2: Panels that are substrate for tile.
  - 3. Level 3: Where indicated herein.
  - 4. Level 4: Where indicated herein.
  - a. Primer and its application to surfaces are specified in other Division 09 Sections.
  - 5. Level 5: Where indicated herein.
  - a. Primer and its application to surfaces are specified in other Division 09 Sections.

E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

### 3.7 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

C. Texture Schedule: Install the following textures on gypsum board walls and ceiling, unless otherwise indicated on drawings or schedules:

1. Electrical Rooms, Mechanical Rooms, Attic Rooms / Spaces, Mechanical Attics, and Mechanical Mezzanines: Smooth Level 3 finish.
2. All Other Rooms: Smooth Level 5 finish.

### 3.8 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900



1 SECTION 093000 - TILING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Ceramic tile.  
9 2. Glass tile  
10 3. Waterproof membrane.  
11 4. Metal edge strips.

- 12 B. Related Sections:

- 13 1. Division 09 Section "Gypsum Board" for glass-mat, water-resistant backer board.

14 1.3 DEFINITIONS

- 15 A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1  
16 apply to Work of this Section unless otherwise specified.

- 17 B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B,  
18 ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9,  
19 ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14,  
20 ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American  
21 National Standard Specifications for Installation of Ceramic Tile."

- 22 C. Module Size: Actual tile size plus joint width indicated.

- 23 D. Face Size: Actual tile size, excluding spacer lugs.

24 1.4 PERFORMANCE REQUIREMENTS

- 25 A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the  
26 following values as determined by testing identical products per ASTM C 1028:

- 27 1. Level Surfaces: Minimum 0.6.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
- C. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required. 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. Make samples at least 12 inches (300 mm) 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 for each color and finish required.
  - 4. Stone thresholds in 6-inch (150-mm) lengths.
  - 5. Metal edge strips in 6-inch (150-mm) lengths.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.
- C. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- D. Product Certificates: For each type of product, signed by product manufacturer.
- E. Material Test Reports: For each tile-setting and -grouting product.

1.7 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.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Installer shall be regularly engaged in installation of the systems specified, thoroughly familiar with materials and techniques, employing skilled workmen, provide proof of at least 10 similar installations in good condition, shall be established in the tile

1 installation business for not less than 5 continuous years under the same name and shall have  
2 not less than 5 years experience in installation of similar tile systems.

3 B. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or  
4 producer.

5 1. Obtain tile of each type and color or finish from same production run and of consistent  
6 quality in appearance and physical properties for each contiguous area.

7 C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality  
8 for each mortar, adhesive, and grout component from one manufacturer and each aggregate  
9 from one source or producer.

10 D. Source Limitations for Other Products: Obtain each of the following products specified in this  
11 Section from a single manufacturer for each product:

- 12 1. Stone thresholds.  
13 2. Waterproof membrane.  
14 3. Joint sealants.  
15 4. Metal edge strips.

16 E. Mockups: Build mockups to verify selections made under sample submittals and to  
17 demonstrate aesthetic effects and set quality standards for materials and execution.

- 18 1. Build mockup of each type of floor tile installation.  
19 2. Build mockup of each type of wall tile installation.  
20 3. Approved mockups may become part of the completed Work if undisturbed at time of  
21 Substantial Completion.

22 F. Pre-installation Conference: Conduct conference at Project site.

- 23 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

24 1.9 DELIVERY, STORAGE, AND HANDLING

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

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

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

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

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

1.10 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

- C. FloorScore Compliance: Tile for floors shall comply with requirements of FloorScore Standard.

- D. 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.

- E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

- F. 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.

- G. Basis-of-Design Product:

1. Tile: The design for each tile type is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
2. Grout: Grout shall be of a manufacturer meeting these specifications, providing they can provide grout in colors that are acceptable to the Architect.

- H. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specified products or materials complying with the following requirements:



1. As selected by Architect from manufacturer's full range, unless specific selections are made herein or on Drawings. See Color Schedule on the Drawings. Acceptability of all manufacturers for tile and grout is dependent upon availability of color acceptable to the Architect.

## 2.2 TILE PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, and provided they have products of similar size and color to the basis-of-design product, provide one of the products specified.

1. Bellavita Tile
2. American Olean; Div. of Dal-Tile International Corp.
3. Ann Sacks; Division of Kohler Interiors.
4. Daltile; Div. of Dal-Tile International Inc.
5. Florida Tile Industries, Inc.
6. United States Ceramic Tile Company.
7. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

- B. Un-glazed Porcelain Mosaic Tile: Factory-mounted flat tile as follows:

1. Composition: Porcelain.
2. Surface: Slip-resistant, with abrasive admixture.
3. Module Size: 1 x 1 inch (25.4 by 25.4 mm).
4. Nominal Thickness: 3/8 inch
5. Face: Pattern of design indicated, with cushion edges.
6. Basis-of-Design Product: Bellavita Tile, Rivergrass Collection, "Wild Oat"

- a. Product and Colors: See Color Schedule on Drawings.

7. Location: Floors scheduled to receive porcelain tile (PT).

- C. Un-glazed Porcelain Tile – Interior Walls: Factory-mounted flat tile as follows:

1. Composition: Porcelain.
2. Module Size: 12 x 24 inches.
3. Thickness: 3/16 inch.
4. Grout Joint: 1/8 inch
5. Face: Pattern of design indicated, with cushion edges.
6. Trim: Provide bullnose
7. Basis-of-Design Product: Daltile - Spark "Toasted Luster"

- a. Product and Colors: See Color Schedule on Drawings.

8. Location: Interior walls scheduled or noted to receive porcelain tile (PT).

- D. Un-glazed Porcelain Tile – Interior Walls (Back Splash): Factory-mounted flat tile as follows:

1. Composition: Porcelain.
2. Module Size: 2 x 2 inches.

3. Thickness: 5/16 inch.
4. Grout Joint: 1/8 inch
5. Face: Matte, with cushion edges.
6. Basis-of-Design Product: Daltile -Modern Dimensions "Suede Grey" and "Arctic White"

a. Product and Colors: See Color Schedule on Drawings.

7. Location: Interior walls scheduled or noted to receive porcelain tile (PT). See diagram on drawings for custom layout. Mosaic pattern with glass tile accent.

E. Glass Tile – Interior Walls (Back Splash): Factory-mounted flat tile as follows:

1. Composition: Glass.
2. Module Size: 2 x 2 inches.
3. Thickness: 5/16 inch.
4. Grout Joint: 1/8 inch
5. Face: Glossy, with cushion edges.
6. Basis-of-Design Product: Interstyle – Glasshues "Pond Green"

a. Product and Colors: See Color Schedule on Drawings.

Location: Interior walls scheduled or noted to receive porcelain tile (PT). See diagram on drawings for custom layout. Mosaic pattern with glass tile accent.

F. Ceramic Mosaic Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:

1. Base Cove: Cove, module size to match the adjoining tile.
2. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size to match the adjoining tile.
3. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.

2.3 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Locations for Use: Install at floors under all ceramic tile, and behind all wall tile.

C. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Boiardi Products; a QEP company; Elastiment 344 Reinforced Waterproofing and Anti-Fracture/Crack Suppression Membrane.

- b. Bonsal American; an Oldcastle company; B 6000 Waterproof Membrane with Glass Fabric.
- c. Bostik, Inc.; Hydroment Blacktop 90210.
- d. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
- e. Laticrete International, Inc.; Laticrete 9235 Waterproof Membrane.
- f. MAPEI Corporation; Mapelastic L (PRP M19).
- g. Mer-Kote Products, Inc.; Hydro-Guard 2000.
- h. Summitville Tiles, Inc.; S-9000.
- i. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

## 2.4 SETTING MATERIALS

### A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils (0.1 mm) thick.
2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches (50.8 by 50.8 mm) by 0.062-inch (1.57-mm) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
3. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

### B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

## 2.5 GROUT MATERIALS

### A. Manufacturers: Subject to compliance with requirements, provide one of the products specified. They must, however, be able to provide the specified epoxy grout materials in the specified joint widths, and in colors acceptable to the Architect to receive approval.

1. Bonsal, W. R., Company.
2. Bostik.
3. Custom Building Products.
4. LATICRETE International Inc.
5. Southern Grouts & Mortars, Inc.
6. TEC Specialty Products Inc.
7. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

### B. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D.

1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.

- C. Grout for PregROUTED Tile Sheets: Same product used in factory to pregROUT tile sheets.

## 2.6 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."

1. Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

- C. Chemical-Resistant Sealants: Provide chemical-resistant elastomeric sealant of type recommended and produced by chemical-resistant mortar and grout manufacturer for type of application indicated, with proven service record and compatibility with tile and other setting materials, and with chemical resistance equivalent to mortar/grout.

## 2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

- B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

- C. 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. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F (49 to 60 deg C) per ASTM D 87.

- D. 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.

## 2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  - 3. Verify that 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.

#### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return tile to manufacturer or blend tiles at Project site before installing.

3.3 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
- a. Tile floors in wet areas.
- b. Tile floors composed of 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. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. 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.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
2. Glazed Wall Tile: 1/16 inch (1.6 mm).
- G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- H. Metal Edge Strips: Install at locations indicated, and where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 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 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.

3.6 FLOOR TILE INSTALLATION SCHEDULE

- A. Tile Installation at slab on grade floor construction: Interior floor installation on waterproof membrane over concrete cement mortar bed (thickset) epoxy grout; TCA F121 and ANSI A108.1A.
  - 1. Tile Type: Unglazed ceramic mosaic.
  - 2. Grout: Chemical-resistant, water-cleanable, tile-setting and –grouting epoxy.
- B. Tile Installation at slab on metal deck floor construction: Interior floor installation on waterproof membrane over concrete; thin-set mortar; TCA B422 and ANSI A118.10.
  - 1. Tile Type: Unglazed ceramic mosaic tile.
  - 2. Thin-Set Mortar: Latex-portland cement mortar.
  - 3. Grout: Chemical-resistant, water-cleanable, tile-setting and –grouting epoxy.

1    3.7        WALL TILE INSTALLATION SCHEDULE

2        A.    Tile Installation at all Walls: Interior wall installation over glass-mat, water-resistant backer  
3        board with waterproof membrane; thin-set mortar; TCA B422 and ANSI A118.10.

4            1.    Tile Type: Glazed ceramic tile.

5            2.    Thin-Set Mortar: Latex-portland cement mortar.

6            3.    Grout: Chemical-resistant, water-cleanable, tile-setting and –grouting epoxy.

7    END OF SECTION 093000



1 SECTION 095113 - ACOUSTICAL PANEL CEILINGS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes acoustical panels, and exposed suspension systems for ceilings.

- 8 B. Related Requirements:

- 9 1. Division 09 Section “Linear Wood Ceilings” for other ceiling systems not specified in  
10 this Section.  
11 2. Divisions 23, 26 and 33 Sections for coordination of mechanical, electrical and fire  
12 sprinklering items installed in/on ceiling grids.

13 1.3 PREINSTALLATION MEETINGS

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

15 1.4 ACTION SUBMITTALS

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

- 17 B. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm)  
18 in size.

- 19 C. Samples for Initial Selection: For components with factory-applied color finishes.

- 20 D. Samples for Verification: For each component indicated and for each exposed finish required,  
21 prepared on Samples of size indicated below.

- 22 1. Acoustical Panel: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern,  
23 and texture.  
24 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- (150-mm-)  
25 long Samples of each type, finish, and color.

26 1.5 INFORMATIONAL SUBMITTALS

- 27 A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items  
28 are shown and coordinated with each other, using input from installers of the items involved:

- 1 1. Suspended ceiling components.
- 2 2. Structural members to which suspension systems will be attached.
- 3 3. Size and location of initial access modules for acoustical panels.
- 4 4. Items penetrating finished ceiling including the following:
  - 5 a. Lighting fixtures.
  - 6 b. Air outlets and inlets.
  - 7 c. Speakers.
  - 8 d. Sprinklers.
  - 9 e. Access panels.
- 10 5. Perimeter moldings.
- 11 B. Buy America: Certification that all steel components are provided in compliance with the Buy
- 12 America requirements.
- 13 C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer
- 14 and witnessed by a qualified testing agency.
- 15 D. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.
- 16 1.6 CLOSEOUT SUBMITTALS
- 17 A. Maintenance Data: For finishes to include in maintenance manuals.
- 18 1.7 MAINTENANCE MATERIAL SUBMITTALS
- 19 A. Furnish extra materials that match products installed and that are packaged with protective
- 20 covering for storage and identified with labels describing contents.
  - 21 1. Acoustical Ceiling Panels: Full-size panels equal to 2 percent of quantity installed.
  - 22 2. Suspension-System Components: Quantity of each exposed component equal to 2
  - 23 percent of quantity installed.
- 24 1.8 QUALITY ASSURANCE
- 25 A. Installer Qualifications: Installer shall be regularly engaged in installation of the systems
- 26 specified, thoroughly familiar with materials and techniques, employing skilled workmen,
- 27 provide proof of at least 10 similar installations in good condition, shall be established in the
- 28 suspended ceiling installation business for not less than 5 continuous years under the same name
- 29 and shall have not less than 5 years experience in installation of similar systems.
- 30 B. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the
- 31 effects of earthquake motions according to the following:
  - 32 1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with
  - 33 ASTM E 580.
  - 34 2. ASTM Standard C636, "Standard Practice for Installation of Metal Ceiling Suspension
  - 35 System for Acoustical Tile and for Lay-in Panels."

1.9 DELIVERY, STORAGE, AND HANDLING

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

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
  - 2. Smoke-Developed Index: 450 or less.

2.2 ACOUSTICAL PANELS, GENERAL

- A. Source Limitations:
  - 1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
  - 2. Suspension System: Obtain each type from single source from single manufacturer.
- B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.
- C. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.

D. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E 795.

E. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

### 2.3 ACOUSTICAL PANELS: Panels with hidden grid.

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong; "OPTIMA VECTOR" for 2x4 panels, or comparable product by one of the following, provided they meet all of the specification requirements and are judged equivalent in appearance by the Architect:

1. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

B. Locations: For all ceilings where 2x4 (Type VII acoustical panels) with a hidden grid are indicated, unless noted otherwise.

C. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:

1. Type and Form: Type and form matching the basis of design product.
2. Pattern: As indicated by manufacturer's designation.

D. Color: White.

E. AC: Not less than 190.

F. NRC: Not less than 0.90.

G. Edge/Joint Detail: Armstrong Vector for hidden grid.

H. Thickness: 7/8 inch.

I. Modular Size: 24 by 48 inches (610 by 1220 mm), as indicated on the drawings.

J. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or

bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

#### 2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

- 1 G. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to  
2 accommodate seismic forces.
- 3 H. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic  
4 forces.
- 5 I. Seismic Clips: If required by authorities having jurisdiction, manufacturer's standard seismic  
6 clips designed and spaced to secure acoustical panels in place.

7 2.5 METAL SUSPENSION SYSTEM

- 8 A. Manufacturers: Subject to compliance with requirements, provide products by one of the  
9 following:

- 10 1. Armstrong World Industries, Inc; Prelude XL Heavy Duty.  
11 2. CertainTeed Corp.  
12 3. Chicago Metallic Corporation.  
13 4. USG Interiors, Inc.; Subsidiary of USG Corporation.  
14 5. Or approved substitute during the bid process per the Instructions to Bidders and Section  
15 012500.

- 16 B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll  
17 formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip  
18 galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation;  
19 with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.

- 20 1. Structural Classification: Heavy-duty system.  
21 2. End Condition of Cross Runners: Override (stepped) type.  
22 3. Face Design: Flat, flush.  
23 4. Cap Material: Steel or aluminum cold-rolled sheet.  
24 5. Cap Finish and Color: Painted white unless indicated otherwise on drawings.

25 2.6 METAL EDGE MOLDINGS AND TRIM

- 26 A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not  
27 indicated, manufacturer's standard moldings for edges and penetrations that comply with  
28 seismic design requirements; formed from sheet metal of same material, finish, and color as that  
29 used for exposed flanges of suspension-system runners.

- 30 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and  
31 suspension systems indicated and that match width and configuration of exposed runners  
32 unless otherwise indicated.  
33 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms  
34 reveal of same depth and width as that formed between edge of panel and flange at  
35 exposed suspension member.  
36 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter  
37 required to fit penetration exactly.

- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim for Floating Ceilings: Chicago Metallic "Infinity Perimeter Trim" painted white.

1. Size: As indicated on Drawings.

## 2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

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

### 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  7. Do not attach hangers to steel deck tabs.
  8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
  10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
  2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  3. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.



4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
5. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

#### 3.4 FIELD QUALITY CONTROL

##### A. Special Inspections: Owner may engage a qualified special inspector to perform the following special inspections:

##### 1. Compliance of seismic design.

- a. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
- b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

##### B. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.

#### 3.5 CLEANING

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

END OF SECTION 095113



1 SECTION 095426 - LINEAR WOOD CEILINGS (BID ALTERNATE)

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes

- 8 1. Linear wood members and suspension systems for ceilings indicated as wood slat or  
9 linear wood ceilings.  
10 2. Sound absorption materials.

- 11 B. Related Sections:

- 12 1. Division 09 Section "Acoustical Panel Ceilings" for ceilings consisting of mineral-base  
13 and glass-fiber-base acoustical panels and exposed suspension systems.  
14 2. Division 10 Section, "Signage" for additional application of reclaimed lumber.  
15 3. Divisions 21, 23, and 26 Sections for light fixtures, sprinklers, and air-distribution  
16 components.

17 1.3 ACTION SUBMITTALS

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

- 19 B. Performance Data: For installed products indicated to comply with design loads and other  
20 criteria, include structural analysis and other analytical data signed and sealed by the qualified  
21 professional engineer responsible for their preparation.

- 22 C. Samples for Initial Selection: For components with factory-applied colors and finishes, both  
23 wood and metal members.

- 24 D. Samples for Verification: For each component indicated and for each exposed finish required,  
25 prepared on Samples of size indicated below:

- 26 1. Linear Wood Members: 12-inch- (300-mm-) square panels, assembled with finished  
27 linear wood members. Provide samples in full color range of wood and finish.  
28 2. Suspension System Members: 12-inch- (300-mm-) long Sample of each type.  
29 3. Exposed Molding and Trim: Set of 12-inch- (300-mm-) long Samples of each type,  
30 finish, and color.  
31 4. Sound Insulation Panels: 12 inches (300 mm) long.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Linear pattern.
  2. Joint pattern.
  3. Ceiling suspension members.
  4. Method of attaching hangers to building structure.
- a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
5. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
  6. Ceiling perimeter and penetrations through ceiling; trim and moldings.
  7. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).
- B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.
- C. Shop Drawings: Details, drawn to scale, illustrating as aspects of the ceiling system construction, member size and spacing, connection details, and details of suspension system members and attachment. Minimum scale of details shall be 1-1/2 inch equals 1 foot.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each linear wood ceiling.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Linear Wood Ceiling Components: Quantity of each panel, carrier, accessory, and exposed molding and trim equal to 2 percent of quantity installed.

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain linear wood ceiling components from single source from single manufacturer. Obtain supporting suspension system from a single source, as recommended by the ceiling system manufacturer.
- B. Installer Qualifications: Installer shall be regularly engaged in installation of the systems specified, thoroughly familiar with materials and techniques, employing skilled workmen, provide proof of at least 5 similar installations in good condition, shall be established in the

suspended ceiling installation business for not less than 5 continuous years under the same name and shall have not less than 5 years experience in installation of similar systems.

C. Source Limitations: Obtain each set of linear wood panels and suspension systems from one source with resources to provide products of consistent quality in appearance, physical properties, and performance.

D. Surface-Burning Characteristics: If required by agency having jurisdiction, comply with ASTM E 1264 for Class A materials, as determined by testing identical products according to ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

E. Seismic Standard: Provide linear wood ceilings designed and installed to withstand the effects of earthquake motions according to the following:

1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
2. Any other standards required by the agency having jurisdiction.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Preinstallation Conference: Conduct conference at Project site.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver linear wood panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Handle linear wood panels, suspension system components, and accessories carefully to avoid damaging units and finishes in any way.

C. Climatization: Before installing wood panels, permit them to reach room temperature and stabilized moisture content for at least 72 hours prior to installation. Follow AWI standards.

#### 1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install linear wood ceilings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use, and meet the requirements of the ceiling system manufacturer.

1.10 COORDINATION

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

PART 2 - PRODUCTS

2.1 LINEAR WOOD CEILING SYSTEMS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "9WOOD" ([www.9wood.com](http://www.9wood.com)); Series 1000 Panelized Linear Wood Grille or comparable product by one of the following:

1. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

- B. Product: "9WOOD SERIES 1000 ECOGRILLE" system, or equivalent product from an approved manufacturer.

1. Wood: FSC Pacific Albus.
2. Wood Finish: Stain color to match exterior stain.
3. Member Size: 5/8 x 1-1/8 inch net.
4. Edge Profile: Square.
5. Reveal Between Members: 1 inch.
6. Reveal Between Panel Lengths: 1 inch, or as detailed on Drawings.
7. Members Per Lineal Foot: 8.
8. Panel dimensions: 24" x 48" nominal or as indicated on Drawings.
9. Assembly Style: Cross piece backer.
10. Removable Panels: Where indicated on Drawings for removal panel sections, provide "Caddy®Lock-on" twist clips with black acorn nuts as manufactured by 9Wood.
11. Fire Rating: Class 1(A) Fire Rating if required by the agency having jurisdiction.
12. Reveal Scrim: Black reveal scrim.
13. Opening Reinforcing: Provide at all opening in panels.

2.2 GLASS-FIBER BOARD INSULATION

- A. Manufacturers:

1. CertainTeed Corporation.
2. Johns Manville.
3. Knauf Fiber Glass.
4. Owens Corning.
5. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

- B. Semi-Rigid Acoustic Board Insulation:

1. Product: Owens Corning “SelectSound Black Acoustic Board”, or equivalent from an approved manufacturer.
2. Thickness: 1 inch thick panels, unless noted otherwise on drawings.
3. Tests and Standards: Must meet or exceed the tests and standards established by the manufacturer for the referenced product.
4. Fabrication: Fabricate panels of maximum size available from manufacturer. Cover all cut panel edges with matching black fabric, and securely fasten to panel as recommended by the panel manufacturer.

### 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
  1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
  2. Exterior Members: Minimum G90 galvanizing
- C. Suspension Systems: Provide systems complete with carriers, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips, load-resisting struts, fixture adapters, and other suspension components required to support ceiling units and other ceiling-supported construction.
- D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
- E. Wire Hangers, Braces, and Ties: Provide wire complying with the following requirements:
  1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  2. Size: Select wire diameter so its stress at 3 times the hanger design load indicated in ASTM C 635, Table 1, Direct Hung will be less than yield stress of wire, but provide not less than 0.135-inch- (3.5-mm-) diameter wire.
- F. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- G. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed from 0.04-inch- (1.0-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
- H. Carriers: Factory finished with matte-black baked finish.
  1. Main Carriers: Steel, not less than 0.0209-inch (0.53-mm) nominal thickness, cold-rolled sheet, with factory-applied protective coating, complying with ASTM C 635.

1                   a.     Electrolytic Zinc-Coated Steel: ASTM A 591/A 591M, not less than 80Z (24G)  
2                   zinc coating.

3           I.     Carrier Splices: Same metal, profile, and finish as indicated for carriers.

4           J.     Stabilizer Channels, Tees, and Bars: Manufacturer's standard components for stabilizing main  
5           carriers at regular intervals and at light fixtures, air-distribution equipment, access doors, and  
6           other equipment; spaced as standard with manufacturer for use indicated; and factory finished  
7           with matte-black baked finish.

8           K.     Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic  
9           forces.

10   2.4     METAL SUSPENSION SYSTEM - INTERIOR

11       A.     Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll  
12       formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip  
13       galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation;  
14       with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.

- 15           1.     Structural Classification: Heavy-duty system.  
16           2.     End Condition of Cross Runners: Override (stepped) type.  
17           3.     Face Design: Flat, flush.  
18           4.     Cap Material: Steel or aluminum cold-rolled sheet.  
19           5.     Cap Finish and Color: Painted black unless indicated otherwise on drawings.  
20           6.     Acoustically Transparent Scrim: Provide, factory attached over reveals to black-out grid  
21           and plenum views.

22   2.5     METAL SUSPENSION SYSTEM - EXTERIOR

23       A.     Framing as indicated on Drawings.

24   2.6     METAL EDGE MOLDINGS AND TRIM

25       A.     Provide Chicago Metallic "Infinity Perimeter Trim" painted black.

26   2.7     GENERAL FINISH REQUIREMENTS

27       A.     Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for  
28       recommendations for applying and designating finishes.

29       B.     Protect mechanical finishes on exposed surfaces from damage by applying a strippable,  
30       temporary protective covering before shipping.

31       C.     Appearance of Finished Work: Noticeable variations in same piece are not acceptable.  
32       Variations in appearance of adjoining components are acceptable if they are within the range of  
33       approved Samples and are assembled or installed to minimize contrast.



2.8 STEEL SHEET FINISHES

- A. Electroplated Finish: Electroplating process complying with finish manufacturer's written instructions for surface preparation, pretreatment, process, and minimum thickness to produce a coating uniform in appearance and free of blisters, pits, roughness, nodules, burning, cracks, unplated areas, and other visible defects.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of linear wood panels to balance border widths at opposite edges of each ceiling. Comply with layout shown on reflected ceiling plans and Coordination Drawings.

3.3 INSTALLATION

- A. Comply with ASTM C 636 and seismic requirement indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook", and as required to meet the requirements of the agency having jurisdiction.
- B. Suspend ceiling hangers from building's structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate to which hangers are attached and for type of hanger involved.
  5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and

- appropriate for both structure to which hangers are attached and type of hanger involved.  
Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  8. Do not attach hangers to steel deck tabs.
  9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
  11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Install edge moldings and trim of type indicated at perimeter of suspension system area as recommended by the manufacturer.
1. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension system carriers so they are aligned and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Scribe and cut linear wood panels for accurate fit at borders and at interruptions and penetrations by other work through ceilings.
- F. Install linear wood panels in coordination with suspension system, as recommended by the ceiling system manufacturer.
1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated.
  2. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.
  3. Install sound-insulation as recommended by the ceiling system manufacturer.

#### 3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner may engage a qualified special inspector to perform the following special inspections:
1. Suspended ceiling system.
  2. Hangers, anchors, and fasteners.
- B. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.
- C. Tests and Inspections: Testing and inspecting of completed installations of acoustical panel ceiling hangers and anchors and fasteners shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with installations of acoustical panel ceiling

hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.

1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.

a. Within each test area, testing agency will select 1 of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every 2 postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.

b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical system ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

### 3.5 CLEANING

A. Clean exposed surfaces of linear wood ceilings as recommended by the manufacturer, including trim and edge moldings after removing temporary protective covering if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

B. Touch-up minor finish damage as recommended by the manufacturer. Remove and replace wood ceiling components that cannot be successfully cleaned and repaired to the Architect's satisfaction.

END OF SECTION 095426



1 SECTION 096513 - RESILIENT BASE AND ACCESSORIES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Resilient base.  
9 2. Resilient molding accessories.

- 10 B. Related Sections:

- 11 1. Division 09 Section "Tile Carpeting" for coordination with carpeted surfaces.  
12 2. Division 09 Section "Gypsum Board" for coordination with surfaces receiving resilient  
13 base.

14 1.3 ACTION SUBMITTALS

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

- 16 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
17 America requirements.

- 18 C. Samples for Color Selection: For each type of product indicated.

- 19 D. Samples for Verification: For each type of product indicated, in manufacturer's standard-size  
20 Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and  
21 pattern required.

22 1.4 MAINTENANCE MATERIAL SUBMITTALS

- 23 A. Furnish extra materials that match products installed and that are packaged with protective  
24 covering for storage and identified with labels describing contents.

- 25 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or  
26 fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

- B. Mockups: Provide resilient products with mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

- A. Locations: Where “RB” (Rubber Base) is scheduled on drawings.

- B. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following. In addition to meeting all specification standards and requirements, the manufacturer must also have products in colors acceptable to the Architect:

- a. Allstate Rubber Corp.; Stoler Industries.
- b. Armstrong World Industries, Inc.
- c. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
- d. Endura Rubber Flooring; Division of Burke Industries, Inc.
- e. Estrie Products International; American Biltrite (Canada) Ltd.

- 1 f. Flexco, Inc.
- 2 g. Johnsonite.
- 3 h. Mondo Rubber International, Inc.
- 4 i. Musson, R. C. Rubber Co.
- 5 j. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
- 6 k. PRF USA, Inc.
- 7 l. Roppe Corporation, USA.
- 8 m. VPI, LLC; Floor Products Division.
- 9 n. Or approved substitute during the bid process per the Instructions to Bidders and
- 10 Section 012500.
- 11 C. Resilient Base Standard: ASTM F 1861.
- 12 1. Material Requirement: Type TP (rubber, vulcanized thermoplastic).
- 13 2. Manufacturing Method: Group I (solid, homogeneous).
- 14 3. Style: Cove (base with toe).
- 15 D. Minimum Thickness: 0.125 inch (3.2 mm).
- 16 E. Height: 4 inches (102 mm) unless indicated otherwise on drawings.
- 17 F. Lengths: Coils in manufacturer's standard length.
- 18 G. Outside Corners: Preformed.
- 19 H. Inside Corners: Job formed.
- 20 I. Surface: Smooth
- 21 J. Finish: Matte.
- 22 K. Colors and Patterns: As indicated on the Color Schedule on the drawings. The Architect
- 23 reserves the right to change all colors, and to select from the full range of the manufacturers
- 24 colors at no additional charge.
- 25 2.2 RESILIENT MOLDING ACCESSORY
- 26 A. Resilient Molding Accessory:
- 27 1. Manufacturers: Subject to compliance with requirements, provide of the same
- 28 manufacturer as the resilient base.
- 29 B. Description: Carpet edge for glue-down applications, nosing for carpet nosing for resilient floor
- 30 covering, reducer strip for resilient floor covering, joiner for tile and carpet, transition strips,
- 31 and other accessories as shown on the drawings or as otherwise required for a complete and
- 32 proper installation.
- 33 C. Material: Rubber.
- 34 D. Profile and Dimensions: As indicated, and as required for a complete and proper installation,
- 35 and as approved by the Architect.

- E. Colors and Patterns: As indicated on the Color Schedule on the drawings. If not shown on the drawings, color to be as most appropriate to the adjoining flooring materials, as approved by the Architect. The Architect reserves the right to change all colors, and to select from the full range of the manufacturers colors at no additional charge..

## 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

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

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

- C. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.



- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
1. Inside Corners: Use straight pieces of maximum lengths possible.

### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

### 3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
1. Remove adhesive and other blemishes from exposed surfaces.
  2. Sweep and vacuum surfaces thoroughly.
  3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 096513



1

2 SECTION 096813 - TILE CARPETING

3 PART 1 - GENERAL

4 1.1 RELATED DOCUMENTS

- 5 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
6 Specification Sections, apply to this Section.

7 1.2 SUMMARY

- 8 A. Section includes modular carpet tile.

- 9 B. Related Requirements:

- 10 1. Division 03 Section "Grout and Underlayments" for slab preparation for flooring.  
11 2. Division 09 Section "Resilient Base and Accessories" for resilient wall base and  
12 accessories installed with carpet tile.

13 1.3 PREINSTALLATION MEETINGS

- 14 A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in  
15 Division 01 Section, "Project Management and Coordination".

- 16 1. Review methods and procedures related to carpet tile installation including, but not  
17 limited to, the following:

- 18 a. Review delivery, storage, and handling procedures.  
19 b. Review ambient conditions and ventilation procedures.  
20 c. Review subfloor preparation procedures.

21 1.4 ACTION SUBMITTALS

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

- 23 1. Include manufacturer's written data on physical characteristics, durability, and fade  
24 resistance.  
25 2. Include installation recommendations for each type of substrate.

- 26 B. Shop Drawings: Show the following:

- 27 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where  
28 cutouts are required in carpet tiles.  
29 2. Carpet tile type, color, and dye lot.

3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

#### 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

C. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

D. Sample Warranty: For special warranty.

#### 1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II or Master II certification level.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.10 FLOOR PREPARTION

A. General:

1. Sub-floor preparation is to include all required work to prepare new floors for installation of the product as specified in this document. Sub-floor preparation shall meet all conditions as specified in this document. Sub-floor preparation shall meet all conditions as specified in the Manufacturer's installation instructions.
2. All materials used in sub-floor preparation and repair shall be recommended by the carpet manufacturer or shall be chemically and physically compatible with the specified carpet system.
3. Site conditions shall include those specified in the carpet manufacturers installation instructions and shall also include area heat, light and power required for effective and efficient working conditions.
4. Provide unobstructed spaces for carpet installation to include removing and replacing furniture and equipment in the installation area.

B. Sub-floors:

1. Concrete:

- a. Concrete shall be cured, clean and dry. It shall be free of curing or parting agents that interfere with the bonding of the adhesive.
- b. The General Contractor shall submit verification that the flooring subcontractor has accepted the moisture and alkalinity condition of the slab to determine its suitability as a substrate for the material to be installed.
- c. Whenever a powdery or porous surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for the glue down installation.
- d. Patching of cracks and depressions shall be made with a compatible patching compound. Do not exceed manufacturer's recommendations for patch thickness. Large patched areas must be primed.

2. Primers:

- a. The use of primers on floor surfaces is generally not necessary except for sanded, dusty, porous and acoustical surfaces. Priming cannot overcome moisture

conditions and must not be used for that purpose. When used, primers must be thin and fast drying. They must be compatible with adhesives, which should be applied only after primer is dry.

C. Moisture & Alkalinity in Concrete Sub-floors:

1. To prevent glue-down installation failures due to moisture and alkalinity, the subcontractor shall be responsible for providing written moisture and alkali test results to the general contractor pertaining to the concrete slab prior to installation. The subcontractor shall perform as many moisture and alkalinity test as are necessary to determine when the concrete floors in various portions of the building(s) are ready for carpet installation. This shall include a test at least two months in advance of the scheduled carpet installation to determine whether the concrete is curing at an adequate rate to facilitate carpet installation in accordance with the project schedule. Should the test(s) reveal the concrete has not yet reached levels of moisture and alkalinity content that are acceptable to the carpet manufacturer, the General Contractor shall increase heat and outside air circulation (and take other measures as necessary) in the affected areas of the building as necessary to assist in speeding the cure rate of the concrete.

a. Moisture:

- 1) At least 90 days are to be allowed for a concrete slab to cure and reach an acceptable dryness. Installation prior to 90 days shall be only with appropriate moisture test results, and the carpet manufacturer's written acceptance.
- 2) All concrete floors should be tested to determine the moisture emission rate by utilizing a calcium chloride moisture test kit. This is a very precise test and must be conducted carefully with strict attention to the test kit manufacturer's instruction. Other test methods may be considered when acceptable to the carpet manufacturer. Various locations in the area should be tested. Moisture tests on slabs below 55° F (13° C) are not acceptable.
- 3) Consult the carpet manufacturer to determine acceptable moisture emission rates for specific products.

b. Alkalinity:

- 1) A pH range of 5-9 is satisfactory; however, a reading above 9 requires corrective measures. The pH on the surface of the concrete can be determined by slightly wetting the floor and applying pH test paper. Consult the adhesive manufacturer for recommended corrective procedures.

1.11 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

C. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

D. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

E. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

F. Temperate & Humidity:

1. Carpet shall be installed when the temperature is between 65° F and 95° F (18° C) for 48 hours prior to installation.

G. Space Enclosure and Environmental Limitations: Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

## 1.12 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 CARPET TILE

A. General: Use of formaldehyde, formaldehyde by- products and 4-phenylcyclohexene in the manufacture of the carpeting material and adhesive is prohibited. Should manufacturer listed herein use these products in the carpet or adhesive, they are here by excluded even if listed as an approved manufacturer.

B. Acceptable Manufacturers:

1. Shaw Carpets
2. Interface
3. Mohawk Group
4. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500. Substitution requests shall include a physical sample for Architect's review.

C. Product:

1. Product Basis of Design: Shaw Contract Group “Ingrain alterNATURE” carpet tile, or approved substitution complying with minimum specifications.
2. Colors: See Color Schedule on the drawings. The Architect reserves the right to change colors and select from the manufacturers full range of available colors at no additional charge. Colors shall not be produced by means of pre-metalized dies.
3. Construction: Multi-Level Pattern Loop/Cut.
4. Fiber: Eco Solution ‘q’ nylon.
5. Dye Method: 53% solution dyed / 47% yarn dyed.
6. Primary Backing: 100% synthetic
7. Secondary Backing: Shaw “Ecoworx Tile”.
8. Tufted Weight: 32 ounces per sq. yd. min.
9. Finished Pile Thickness: Approximately 0.150 inch.
10. Total Thickness: 0.300 inch.
11. Stitches Per Inch: 10 min.
12. Gauge: 1/12.
13. Average Density: 7680.
14. Width: 24 by 24 inch.
15. Protective Treatment: Shaw SSP Shaw Soil Protection.
16. Flooring Radiant Panel: ASTM E-648, Class 1.
17. Smoke Density: NFPA 258 – Passes
18. Pattern Repeat: None.
19. Electrostatic Propensity: Less than 3.5 kv.
20. Environmental Certification: Green label plus certification.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
  1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Metal Edge/Transition Strips: Provide transition strips of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.
  1. Carpet to Concrete: Heavy duty aluminum carpet bar.
    - a. Eagle Moldings C-144
    - b. Color: Black anodized.



PART 3 - EXECUTION

3.1 EXAMINATION

- A. With installer present, examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: With installer present, verify that concrete slabs comply with ASTM F 710 and the following:
  - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
  - 2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet tile.
  - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Installer to broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.

- 1 D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in  
2 furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut  
3 edges as recommended by carpet tile manufacturer.
- 4 E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable  
5 flanges, alcoves, and similar openings.
- 6 F. Maintain reference markers, holes, and openings that are in place or marked for future cutting  
7 by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking  
8 device.
- 9 G. Install pattern parallel to walls and borders.
- 10 H. Installation Pattern: Ashlar.

11 3.4 CLEANING AND PROTECTION

- 12 A. Installer shall perform the following operations immediately after installing carpet tile:
  - 13 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner  
14 recommended by carpet tile manufacturer.
  - 15 2. Remove yarns that protrude from carpet tile surface.
  - 16 3. Vacuum carpet tile using commercial machine with face-beater element.
- 17 B. Protect installed carpet tile to comply with CRI 104, Section 16, “Protecting Indoor  
18 Installations.”
- 19 C. Protect carpet tile against damage from construction operations and placement of equipment and  
20 fixtures during the remainder of construction period. Use protection methods indicated or  
21 recommended in writing by carpet tile manufacturer.

22 END OF SECTION 096813

1 SECTION 099123 - PAINTING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes surface preparation and the application of paint systems on exterior and  
8 interior substrates.

- 9 1. "Paint" as used herein means all coating systems materials, including primers, emulsions,  
10 enamels, stains, sealers and fillers, and other applied materials whether used as primer,  
11 intermediate or finish coats, plus all preparation of surfaces to receive paint.  
12 2. Priming and coats of paint specified are in addition to shop-priming and surface treatment  
13 specified under other sections of work.  
14 3. Work includes painting of all interior items noted, or scheduled, for painting, unless  
15 specified under another section, plus any items not listed herein as factory finished, and  
16 any items factory primed for field painting not specified under another section, and  
17 surface preparation and priming.  
18 4. Work includes field painting of interior exposed bare and covered pipes and ducts, and of  
19 hangers, exposed steel and iron work, and primed metal surfaces of equipment in exposed  
20 areas installed under mechanical and electrical work, except as otherwise indicated, and  
21 except as specified under other sections.

- 22 B. No Finish Required: Unless specifically specified otherwise, the following surfaces or  
23 categories of work are not included as part of field-applied finish work of this section:

- 24 1. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-  
25 finishing or installer-finishing is specified for such items as (but not limited to) integrally  
26 colored concrete masonry, brick, toilet partitions and screens, acoustic materials, custom  
27 casework, plastic laminate surfaced wood and plywood, glass, sealant (excluding  
28 caulking as specified herein), ceramic tile, floor coverings, elevator equipment, and  
29 finished mechanical and electrical equipment including luminous ceilings, lighting  
30 fixtures, switch gear and distribution panels  
31 2. Exposed Finish Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized  
32 aluminum, stainless steel, chromium plate, copper, brass, bronze and similar finished  
33 materials will not require finish painting.  
34 3. Operating Parts: Do not paint moving parts of operating units such as valves, damper  
35 operators, sensing devices, linkage, motor and fan shafts, and similar unless otherwise  
36 indicated.  
37 4. Code-Required Labels: Do not paint over code-required labels, such as fire rated labels  
38 on doors and frames.

D. Related Requirements:

1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
2. Division 06 Sections for shop priming carpentry with primers specified in this Section.
3. Division 08 Sections for factory priming windows and doors with primers specified in this Section.
4. Division 09 painting Sections for high-performance and special-use coatings.
5. Division 09 Section "Resinous CMU Wall Systems" for interior finishes to CMU walls, where 'ME' is scheduled.
6. Division 09 Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
7. Division 09 Section "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
  1. Color Sample Box: Submit one manufacturer's color box with the full line of color samples in approximately 4 x 6 inch sample size.
  2. Color Wheel: In addition to sample color box, submit one full spectrum color wheel for each of the various coatings involved, for Architect's use for color selections. Submit additional color wheels or the like for specialty coatings of other manufacturers where different from general paint supplier.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Applied Finish Samples: Submit samples of each color, texture, and sheen on rigid backing, 8-1/2 inches x 11 inches. Submit 4 sets of each color and finish.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area and schedule reference from Color Schedule.
5. Label each Sample with the paint manufacturer's name, paint color name and number, and the specified manufacturer color name and number from the architectural drawings.
6. Where directed by the Architect, the Contractor shall provide custom colors to match the Architect's samples, colors indicated on the Color Schedule, or as required to achieve the color desired by the Architect.
7. Additional Applied Finish Samples: Furnish additional sets of samples, in the quantities noted herein, until colors, finishes, textures are reviewed and accepted by the Architect/Owner (followed by written authorization to proceed).
8. Time: Allow ample time for submittal and resubmittal of color samples. Do no work on site until all samples are approved. Samples cannot be reviewed or approved until all building color samples have been provided.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

E. Qualification Data: Submit proof of compliance with all requirements of the Quality Assurance article herein.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 1 new unopened gallon of each paint color and type used on the Project.

1.6 QUALITY ASSURANCE

A. Referenced Standards:

1. Master Painters Institute (MPI): Except as hereinafter specified, for materials and workmanship, conform to the "Architectural Painting Specification Manual" as published by the Master Painters Institute, hereinafter referred to as "MPI", as published by the following:

a. International:

Master Painters Institute  
4090 Graveley Street  
Burnaby, BC  
Canada V5C 3T6

b. United States of American:

PDCA – Painting & Decorating Contractors of America  
3913 Old Lee Highway, Suite 33-B  
Fairfax, Virginia 22030-2433  
703-359-0826  
[www.pdca.org](http://www.pdca.org)

c. State of Washington:

PDCA – Washington State Council  
870 SW 136<sup>th</sup> Street  
Burien, WA. 98166  
206-243-7477

2. Consult the MPI Manual for surfaces not specifically mentioned in this Section.
3. Work in this Section may be inspected and tested by an independent inspection agency at the Owner's option and expense. If the Owner engages a testing agency, notify inspection agency at least ten (10) full working days prior to starting work under this Section. Allow full access to the work and give full cooperation at all times with the inspection agency in the performance of their duties of inspecting and testing the work. Painting contractor shall repair all destructive testing sites.
4. Conform to above Manual's entire standards for "Custom" materials and work, except as otherwise indicated.
5. Inspection and testing fees for work of this Section shall be paid for by the Owner. The Contractor, shall, however, make all arrangements with the testing agency and notify them of award of contract, the amounts of the contract, and the commencement of work.
6. SSPC Volume 1 and 2.
7. Manufacturer's printed installation instructions.

B. Regulatory Agency Requirements:

1. Occupational Safety & Health and Pollution Regulations: Conform to the Federal and State requirements for painting work applicable to this project.
2. Permits: Obtain and pay for any special permits required by local governmental agencies.
3. Codes: Conform to any special local code requirements applicable to work of this Section.

C. Qualifications:

1. Manufacturer and Materials: Unless specifically specified otherwise, use only the approved products of either the paint manufactures scheduled in this Section, or one of the paint manufacturers list in the MPI – both have prior approval for manufacturers. Even if listed in MPI, a manufacturer's product is not approved for use unless it is demonstrated as fully equivalent to the specific specified products, with proof being provided through the submittals process. Proof of equivalency belongs to the Contractor, and the Architect shall be the sole judge of acceptability.
2. General Application: The firm engaged for work under this Section shall, upon request, furnish in writing his qualifications attesting to past satisfactory experience in painting work of not less than the scope of this Project.
  - a. Maintain a crew of painters throughout duration of the painting work who shall be qualified to fully satisfy the requirements of these Specifications.
  - b. Employ only qualified journeymen, in this painting work; apprentices may be employed on the project to work under the direction of qualified journeymen, in accordance with trade regulations.

D. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits

E. Coordination:

1. Provide finish coats which are compatible with prime paints used.
2. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coating system for various substrates.
3. Upon request from other trades, furnish information on characteristics of specified finish materials provided for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required.

F. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
  - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
  - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
  - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job site in unbroken sealed packages with manufacturer's original labels thereon, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing and/or reducing. Do not open until Architect/Owner inspects and approves.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.
- C. Take all necessary precautionary measure to prevent fire hazards and spontaneous combustion; place cotton waste, cloths, and other hazardous materials in containers, and remove from site daily.
- D. Toxic, acetic, and explosive materials: Take regular appropriate safety precautions conforming to manufacturer's recommendations and applicable "Regulatory Requirements".

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Do not apply paints when dirt or insects are present.

1.9 WARRANTY

- A. Installers Warranty: Two years from the date of Substantial Completion for full labor and materials on all installed painting systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: For specification purposes, PPG and other specific manufacturer's products are referenced. Any manufacturer listed in the MPI manual with similar, equivalent products may be used without the need to submit for a "Substitution", provided the manufacturer can furnish all specified products and that they are all deemed equivalent by the Architect. Non-MPI substitutions will not be considered



B. Products: Subject to compliance with requirements, provide product listed in Part 3 for the paint category indicated, or an equivalent product from an approved manufacturer.

C. Material Quality:

1. Provide the best quality grade of the various types of coatings as regularly manufactured by approved paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.
2. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommend limits.
3. Provide paints of durable and washable quality.

## 2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.
9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.

D. Colors:

1. Selections: See the Color Schedule on the Drawings. The Architect reserves the right to change any and all colors, and select from the manufacturers full range of available colors, or to select custom colors, all without additional cost.
2. Number of Colors: The number of colors will be as indicated on the Color Schedule on the Drawings. The Contractor shall allow for additional colors to be selected by the Architect at no additional cost, provided the number of additional colors does not exceed 10 percent of the total number of original colors indicated on the Drawings.

3. Color Variations: Vary colors of succeeding coats to readily permit inspection of number of specified coats and to prevent skipping and holidays.

E. Products: See the Schedule included in Part 3 of this Section.

## 2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner may engage the services of a qualified testing agency or inspector to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency or inspector.
2. Testing agency or inspector will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove non-complying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Applicator shall examine areas and conditions under which painting work is to be applied and notify Contractor and Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected in a manner acceptable to applicator, and surfaces approved by Architect. Conform to the MPI manual as to surface conditions and preparations for each various surface to be painted or finished.
2. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or foreign materials.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

A. Surface Conditions:

1. Before Starting Work Under This Section: Do not proceed until any discovered defects have been corrected and surfaces are approved as ready to receive the work under this Section.

2. Upon Starting Work:

a. Conform to Field Quality Control requirements specified hereinafter.

b. Starting work under this Section constitutes acceptance of surfaces by painter.

c. Unless otherwise specified, surfaces considered the responsibility of other trades for work under this Section include:

1) Shop prime coats (if any) of structural steel, miscellaneous metal, sheet metal, and other shop prime coated metal items except for minimal spot touch-up painting at field welds and surfaces abraded during their installation.

2) Gypsum wallboard: finishing of joints, moldings and fastenings.

3) The condition of substrates to be painted or finished under this Section, which may adversely affect the painting work.

4) If substrate, in Contractor's opinion, is not up to industry standards, advise Architect and General Contractor in writing.

B. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

D. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

2. For Mildew Removal: Scrub with Jomax Mildew Cleaner solution, bleaching solution, then rinse with potable water and let thoroughly dry.

- E. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
  - 1. SSPC-SP 3, "Power Tool Cleaning."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- L. Metal Doors and Their Frames and Relite Frames: Prepare surfaces including tops, bottom and side surfaces normally concealed from view by sanding. Solvent wipe per SSPC-SP-1. Exposed surfaces, including but not limited to the face, throat, edges, and stops (all sides), shall be finished as specified in this Section. Coordinate with Division 8 "Glazing" to glaze frames after painting.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Workmanship, General:

1. Highest quality consistent with trade practices, performed by skilled mechanics.
2. Sand interior surfaces between coats.
3. Apply paint and finish materials by method at painter's option. Spray apply finish coat on hollow metal doors and architecturally exposed steel; spread material evenly, with uniform gloss and finish and without runs or sags.
4. Vary color of successive coats to prevent skipping.
5. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.
6. Cut sharp lines against glass, other materials, and different colors.
7. Allow ample time between coats for thorough drying; not less than manufacturer's recommended minimum time.
8. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
9. Paint the backside of access panels, and removable or hinged covers to match the exposed surfaces.
10. Exterior prime and finish coats shall not be applied when air temperature is below plus 45 degrees F.
11. Apply block fillers to be pinhole free.

- C. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

- D. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- E. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

- F. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

- a. Equipment, including panelboards.
- b. Uninsulated metal piping.
- c. Uninsulated plastic piping.
- d. Pipe hangers and supports.
- e. Metal conduit.
- f. Plastic conduit.
- g. Tanks that do not have factory-applied final finishes.
- h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint the following work where exposed in occupied spaces:

- a. Equipment, including panelboards.
- b. Uninsulated metal piping.
- c. Uninsulated plastic piping.
- d. Pipe hangers and supports.
- e. Metal conduit.
- f. Plastic conduit.
- g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
- h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency or independent inspector to inspect and test paint for dry film thickness.

1. If the Owner engages a testing agency or inspector,, notify firm and Owner at least ten (10) full working days prior to starting work under this Section. Allow full access to the work and give full cooperation at all times with the inspection firm in the performance of their duties of inspecting and testing the work.
2. Contractor shall touch up and restore painted surfaces damaged by testing. Refinish to condition approved by Architect.
3. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
4. If paint failure is due to surface preparation, primer application or finish coat application, remove entire system and re-apply.

B. Testing agency / inspector or Owner may:

1. Request product invoices from single source manufacturer of products delivered to site showing the product that is being used on this project is that which was specified in the Contract Documents.
2. Engage services of an independent testing agency and/or laboratory, to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.
3. Perform appropriate tests for any or all of the following characteristics: abrasion resistance, apparent reflectivity, flexibility, wash-ability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis, and perform thickness test.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. Use tarpaulins or drop cloths and masking tape and paper when working above or adjacent to finished work.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. General: Work specified herein is in addition to shop coats called for under other Sections. Products listed in the following schedule are generally those of “PPG” to establish the type and level of quality and paint type required. Also see article 2.1. All paint systems must conform to the MPI manual. If a paint system herein does not comply with the MPI, contact the Architect for clarification.
- B. Hollow Metal Doors & Door Frames: Provided under Division 09 Section “High-Performance Coatings”.
- C. Exterior Exposed Steel: Provided under Division 09 Section “High-Performance Coatings”.
- D. Steel Panels and Items Noted or Scheduled to be Powder Coated:
  - 1. Surfaces to be powder coated: All exposed surfaces or as noted.
  - 2. Substrate types: Galvanized steel sheet, cold rolled steel sheet, and stainless steel.
  - 3. Pretreatment:
    - a. Sandblast clean to near-white condition per SSPC SP10.
    - b. Remove all grit and clean using an active alkaline cleaner. Iron or zinc phosphate treatments are allowed.
    - c. Rinse thoroughly, and heat immediately to avoid surface rusting.
  - 4. Coating:
    - a. Apply coating at least 0.0025 inches thick using PPG Envirocon 04 polyester powder coating meeting AMMA 2603 or an approved super-durable polyester, urethane, or fluoropolymer powder coating as is most suitable for application.
    - b. For cold-rolled steel, apply an epoxy undercoating.

A. Mechanical, Electrical and Utility Equipment

1. General: Work in this paragraph includes all exposed mechanical, electrical, kitchen and utility equipment including, but not necessarily limited to, rooftop mechanical equipment, plastic gas vents, aluminum exhaust vents, rooftop pipe penetrations, exhaust fan hoods and the like.
2. Prime Coat, Ferrous Metal: “PPG PITT GUARD RAPID COAT D-T-R EPOXY COATING 95-245 series”, 5 to 7 mils DFT.
3. Finish Coats: Apply two coats “PPG PITTHANE HIGH BUILD SEMI-GLOSS URETHANE ENAMEL 95-8800 series, 2.0 to 5.0 mils DFT.

3.7 INTERIOR PAINTING SCHEDULE

A. General

1. Work specified herein is in ADDITION to shop coats called for under various other Divisions and Sections.
2. Unless otherwise specifically noted on Drawings, or set forth hereinafter, all interior surfaces shall be painted, or enameled and/or finished in accordance with the number and type of coats as hereinafter specified.
3. Products listed in the following schedule are generally those of “PPG”. See article 2.1 herein for other manufacturer’s products and substitutions.

B. Interior Wood Trim & Finish, and Casework with Wood Trim:

1. General: All exposed wood trim and finish lumber surfaces in occupied spaces, which are not otherwise specified under work of other Sections to be factory finish, shall be finished under work of this Section by the following systems.
2. Wood Trim, Wainscots and Plywood Equipment Panels, MDO Plywood at designated casework, and Other Wood Items Noted on Drawings to be Painted:
  - a. 1st Coat: “PPG SEAL GRIP Interior/Exterior 100% Acrylic Universal Primer/Sealer 17-921” (1.2 to 1.5 miles dry).
  - b. 2nd Coat: “PPG SPEEDHIDE INTERIOR SEMI-GLOSS ACRYLIC LATEX 6-500” series, (3.0 to 4.0 mils wet, 0.9 to 1.2 miles dry per coat).
  - c. 3rd Coat: “PPG SPEEDHIDE INTERIOR SEMI-GLOSS ACRYLIC LATEX 6-500” series, (3.0 to 4.0 mils wet, 0.9 to 1.2 miles dry per coat).

C. Gypsum Wallboard:

1. Where “GBL”, “GBO”, “GWL”, “GWO” is Scheduled:
  - a. One coat “PPG SPEEDHIDE INTERIOR HIGH BUILD LATEX PRIMER SEALER 6-4”, 4.0 mils WFT, 1.0 mils DFT over gypsum wallboard surfaces prior to texture coating application specified under Division 9 Section “Gypsum Board Assemblies”.
  - b. Two coats “PPG PURE PERFORMANCE” Interior Latex 9-300 Series (4.0 to 4.6 mils wet, 1.5 to 1.8 mils dry per coat). Use semi-gloss enamel for surfaces sched-



uled as “GBO” and “GWO”. Use egg-shell enamel for surfaces scheduled as  
“GBL” and “GWL”.

D. Hollow Metal Relite Frames, Doors & Door Frames, Access Doors, and Metal Frames at Wood  
Door Lites: See Division 09 Section “High-Performance Coatings”.

E. Interior Exposed Steel: All interior exposed steel.

1. Provided under Division 09 Section “High-Performance Coatings”.

F. Steel Panels and Other Items Noted or Scheduled to be Powder Coated:

1. Surfaces to be painted: All exposed surfaces and as indicated, including face, edges, and  
inside surfaces of perforations (to the degree possible).

2. Pretreatment:

a. Sandblast clean to near-white condition per SSPC SP10.

b. Remove all grit and clean using an active alkaline cleaner. Iron or Zinc phosphate  
treatments are allowed.

c. Rinse thoroughly, and heat immediately to avoid surface rusting.

3. Coating:

a. Apply an epoxy undercoating.

b. Apply coating at least 0.0025 inches thick using PPG Envirocon 04 polyester powder  
coating meeting AMMA 2603 or an approved polyester, or TGIC polyester powder  
coating, as is most suitable for application.

G. Mechanical Equipment, Grilles & Diffusers

1. Inside ducts just behind grilles and diffusers: Paint to 12 inches back from grilles, one  
coat dead black flat, same system as specified for interior hollow-metal doors.

2. Exposed Pipes: Paint exposed pipes in occupied and otherwise public areas with finish  
system as specified herein for Interior Exposed Steel, except no painting required in Me-  
chanical rooms and spaces.

3. Ducts Exposed in occupied spaces: Paint exposed ducts in occupied and otherwise public  
areas only where specifically noted for a painted finish, with finish system as specified  
herein for Interior Exposed Steel, color as selected. No painting required in Mechanical  
rooms and spaces.

4. All other mechanical equipment: Surfaces are factory-finished; no painting or finishing  
required.

5. Mechanical grilles and diffusers located in walls with accent paint: Paint to match wall  
using products specified for use at interior hollow metal doors and frames.

H. Electrical Equipment

1. Flush Distribution Panels in Finish-Painted Walls: Paint with same system as specified  
above for interior hollow metal doors and frames, of same finish color as adjacent wall.

2. Surface Mounted Panels: Unless otherwise directed by the Owner, paint with same sys-  
tem as specified above, of same finish color as adjacent wall.

- 1           3.     Conduit: No painting required in Electrical, Mechanical and attic rooms and spaces. At
- 2                 all other locations, paint exposed conduit in areas with finish system as specified herein
- 3                 for Interior Exposed Steel, of same finish color as adjacent wall and/or ceiling, as appli-
- 4                 cable.

5     END OF SECTION 099123

1 SECTION 099300 - STAINING AND TRANSPARENT FINISHING

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes surface preparation and application of wood finishes.

- 8 1. "Paint" or "Stain" as used herein means all coating systems materials, including primers,  
9 stains, sealers and fillers, and other applied materials whether used as primer,  
10 intermediate or finish coats, plus all preparation of surfaces to receive finish.  
11 2. Work includes finishing of all interior and exterior items noted or scheduled for finishing,  
12 unless specified under another section.

- 13 3. Exterior Substrates:

- 14 a. Exposed wood siding.

- 15 4. Interior Substrates:

- 16 a. Exposed wood stripping.  
17 b. Wood door edge sealers.

- 18 B. Related Requirements:

- 19 1. Division 09 Section "Exterior Painting" for standard paint systems on exterior substrates.  
20 2. Division 09 Section "Interior Painting" for standard paint systems on interior substrates.

21 1.3 DEFINITIONS

- 22 A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to  
23 ASTM D 523.

- 24 B. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according  
25 to ASTM D 523.

- 26 C. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

- 27 D. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

- 28 E. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of product indicated.

1. Color Sample Box: Submit one manufacturer's color box with the full line of color samples in approximately 4 x 6 inch sample size.
2. Color Wheel: In addition to sample color box, submit one full spectrum color wheel for each of the various coatings involved, for Architect's use for color selections. Submit additional color wheels or the like for specialty coatings of other manufacturers where different from general paint supplier.

C. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.

1. Applied Finish Samples: Submit on representative samples of actual wood substrates, 8 inches (200 mm) long. Submit 4 sets of each color and sheen.
2. Label each Sample for location and application area and schedule reference from Color Schedule.
3. Label each Sample with the stain manufacturer's name, stain color name and number, and the specified manufacturer color name and number from the architectural drawings.
4. Additional Applied Finish Samples: Furnish additional sets of samples, in the quantities noted herein, until colors and sheens are reviewed and accepted by the Architect/Owner (followed by written authorization to proceed).
5. Time: Allow ample time for submittal and resubmittal of color samples. Do no work on site until all samples are approved. Samples cannot be reviewed or approved until all building color samples have been provided.

D. Product List: For each product indicated, include the following:

1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.
3. VOC content.

E. Qualification Data: Submit proof of compliance with all requirements of the Quality Assurance article herein.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Stains and Transparent Finishes: One (1) new unopened gallon of each stain color and type used on the Project.

1.6 QUALITY ASSURANCE

A. Referenced Standards:

1. Master Painters Institute (MPI): Except as hereinafter specified, for materials and workmanship, conform to the “Architectural Painting Specification Manual” as published by the Master Painters Institute, hereinafter referred to as “MPI”, as published by the following:

a. International:

Master Painters Institute  
4090 Graveley Street  
Burnaby, BC  
Canada V5C 3T6

b. United States of American:

PDCA – Painting & Decorating Contractors of America  
3913 Old Lee Highway, Suite 33-B  
Fairfax, Virginia 22030-2433  
703-359-0826  
[www.pdca.org](http://www.pdca.org)

c. State of Washington:

PDCA – Washington State Council  
870 SW 136<sup>th</sup> Street  
Burien, WA. 98166  
206-243-7477

2. Consult the MPI Manual for surfaces not specifically mentioned in this Section.
3. Work in this Section may be inspected and tested by an independent inspection agency at the Owner’s option and expense. If the Owner engages a testing agency, notify inspection agency at least ten (10) full working days prior to starting work under this Section. Allow full access to the work and give full cooperation at all times with the inspection agency in the performance of their duties of inspecting and testing the work. Painting contractor shall repair all destructive testing sites.
4. Conform to above Manual’s entire standards for “Custom” materials and work, except as otherwise indicated.
5. Inspection and testing fees for work of this Section shall be paid for by the Owner. The Contractor, shall, however, make all arrangements with the testing agency and notify them of award of contract, the amounts of the contract, and the commencement of work.
6. SSPC Volume 1 and 2.
7. Manufacturer’s printed installation instructions.

B. Regulatory Agency Requirements:

1. Occupational Safety & Health and Pollution Regulations: Conform to the Federal and State requirements for painting work applicable to this project.

2. Permits: Obtain and pay for any special permits required by local governmental agencies.
3. Codes: Conform to any special local code requirements applicable to work of this Section.

C. Qualifications:

1. Manufacturer and Materials: Unless specifically specified otherwise, use only the approved products of either the paint manufacturers scheduled in this Section, or one of the paint manufacturers list in the MPI – both have prior approval for manufacturers. Even if listed in MPI, a manufacturer's product is not approved for use unless it is demonstrated as fully equivalent to the specific specified products, with proof being provided through the submittals process. Proof of equivalency belongs to the Contractor, and the Architect shall be the sole judge of acceptability.
2. General Application: The firm engaged for work under this Section shall, upon request, furnish in writing his qualifications attesting to past satisfactory experience in painting work of not less than the scope of this Project.
  - a. Maintain a crew of painters throughout duration of the painting work who shall be qualified to fully satisfy the requirements of these Specifications.
  - b. Employ only qualified journeymen, in this painting work; apprentices may be employed on the project to work under the direction of qualified journeymen, in accordance with trade regulations.

- D. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits

E. Coordination:

1. Provide finish coats which are compatible with prime paints used.
2. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coating system for various substrates.
3. Upon request from other trades, furnish information on characteristics of specified finish materials provided for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required.

- F. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
  - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
  - b. Other Items: Architect will designate items or areas required.
2. Final approval of stain color selections will be based on mockups.
  - a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job site in unbroken sealed packages with manufacturer's original labels thereon, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing and/or reducing. Do not open until Architect/Owner inspects and approves.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.
- C. Take all necessary precautionary measure to prevent fire hazards and spontaneous combustion; place cotton waste, cloths, and other hazardous materials in containers, and remove from site daily.
- D. Toxic, acetic, and explosive materials: Take regular appropriate safety precautions conforming to manufacturer's recommendations and applicable "Regulatory Requirements".

1.8 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior finishes in snow, rain, fog, or mist. Do not apply finishes when dust or insects are present.

1.9 WARRANTY

- A. Installers Warranty: Two years from the date of Substantial Completion for full labor and materials on all installed painting systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: For specification purposes, PPG and other specific manufacturer's products are referenced. Any manufacturer listed in the MPI manual with similar, equivalent products may be used without the need to submit for a "Substitution", provided the manufacturer can furnish all specified products and that they are all deemed equivalent by the Architect. Non-MPI substitutions will not be considered
- B. Products: Subject to compliance with requirements, provide product listed in Part 3 for the category indicated, or an equivalent product from an approved manufacturer.

C. Material Quality:

1. Provide the best quality grade of the various types of coatings as regularly manufactured by approved paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.
2. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommend limits.
3. Provide finishes of durable and washable quality.

2.2 MATERIALS, GENERAL

A. MPI Standards: Provide products that comply with MPI standards and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior stains and finishes applied at project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
2. Shellacs, Clear: VOC not more than 730 g/L.
3. Stains: VOC not more than 250 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.

D. Colors:

1. Selections: See the Color Schedule on the Drawings. The Architect reserves the right to change any and all colors, and select from the manufacturers full range of available colors without additional cost.
2. Number of Colors: The number of colors will be as indicated on the Color Schedule on the Drawings. The Contractor shall allow for additional colors to be selected by the Architect at no additional cost, provided the number of additional colors does not exceed 10 percent of the total number of original colors indicated on the Drawings.
3. Products: See the Schedule included in Part 3 of this Section.

2.3 WOOD FILLERS

A. Wood Filler Paste: MPI #91.



PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Applicator shall examine areas and conditions under which staining work is to be applied and notify Contractor and Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected in a manner acceptable to applicator, and surfaces approved by Architect. Conform to the MPI manual as to surface conditions and preparations for each various surface to be painted or finished.
  2. Starting of staining work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
  3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or foreign materials.
- B. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with electronic moisture meter.
- C. Maximum Moisture Content of Interior Wood Substrates: 13 percent, when measured with electronic moisture meter.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with finish application only after unsatisfactory conditions have been corrected.
1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Surface Conditions:
1. Before Starting Work Under This Section: Do not proceed until any discovered defects have been corrected and surfaces are approved as ready to receive the work under this Section.
  2. Upon Starting Work:
    - a. Conform to Field Quality Control requirements specified hereinafter.
    - b. Starting work under this Section constitutes acceptance of surfaces by painter.
    - c. Unless otherwise specified, surfaces considered the responsibility of other trades for work under this Section include:
      - 1) The condition of substrates to be painted or finished under this Section, which may adversely affect the painting work.
      - 2) If substrate, in Contractor's opinion, is not up to industry standards, advise Architect and General Contractor in writing.

1 B. Comply with manufacturer's written instructions and recommendations in "MPI Architectural  
2 Painting Specification Manual" applicable to substrates indicated.

3 C. Remove hardware, covers, plates, and similar items already in place that are removable. If  
4 removal is impractical or impossible because of size or weight of item, provide surface-applied  
5 protection before surface preparation and finishing.

6 1. After completing finishing operations, use workers skilled in the trades involved to  
7 reinstall items that were removed. Remove surface-applied protection if any.

8 D. Clean and prepare surfaces to be finished according to manufacturer's written instructions for  
9 each particular substrate condition and as specified.

- 10 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly  
11 with clean water and allow to dry. Remove grade stamps and pencil marks by sanding  
12 lightly. Remove loose wood fibers by brushing.  
13 2. Remove mildew by scrubbing with commercial wash formulated for mildew removal and  
14 as recommended by stain manufacturer.

15 E. Exterior Wood Substrates:

- 16 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.  
17 2. Prime edges, ends, faces, undersides, and backsides of wood.  
18 a. For solid hide stained wood, stain edges and ends after priming.  
19 b. For varnish coated stained wood, stain edges and ends and prime with varnish.  
20 Prime undersides and backsides with varnish.  
21 3. Countersink steel nails, if used, and fill with putty or plastic wood filler tinted to final  
22 color. Sand smooth when dried.

23 F. Interior Wood Substrates:

- 24 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.  
25 2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting  
26 Specification Manual," to produce smooth, glasslike finish.  
27 3. Sand surfaces that will be exposed to view and dust off.  
28 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic  
29 wood filler. Sand smooth when dried.

30 3.3 APPLICATION

31 A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI  
32 Architectural Painting Specification Manual."

- 33 1. Use applicators and techniques suited for finish and substrate indicated.  
34 2. Finish surfaces behind movable equipment and furniture same as similar exposed  
35 surfaces.  
36 3. Do not apply finishes over labels of independent testing agencies or equipment name,  
37 identification, performance rating, or nomenclature plates.

B. Workmanship, General:

1. Highest quality consistent with trade practices, performed by skilled mechanics.
2. Sand interior surfaces between coats if recommended by the stain manufacturer.
3. Apply stain materials by method recommended by the stain manufacturer.
4. Allow ample time between coats for thorough drying; not less than manufacturer's recommended minimum time.
5. Stain surfaces behind movable equipment and furniture the same as similar exposed surfaces.
6. Exterior prime and finish coats shall not be applied when air temperature is below plus 45 degrees F, or the manufacturer's recommended temperature, whichever is higher.

C. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 FIELD QUALITY CONTROL

A. Testing: Owner may engage the services of a qualified testing and inspecting agency or independent inspector to inspect and test stain.

1. If the Owner engages a testing agency or inspector, notify firm and Owner at least ten (10) full working days prior to starting work under this Section. Allow full access to the work and give full cooperation at all times with the inspection firm in the performance of their duties of inspecting and testing the work.
2. Contractor shall touch up and restore painted surfaces damaged by testing.
3. If test results show that stain does not comply with manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide system that complies with manufacturer's written recommendations, and pay for re-testing to confirm compliance.
4. If stain failure is due to surface preparation, primer application or finish coat application, remove entire system and re-apply.

B. Testing agency / inspector or Owner may:

1. Request product invoices from single source manufacturer of products delivered to site showing the product that is being used on this project is that which was specified in the Contract Documents.
2. Engage services of an independent testing agency and/or laboratory, to sample stain being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.
3. Perform appropriate tests for any or all of the following characteristics: abrasion resistance, apparent reflectivity, flexibility, wash-ability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention,

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

- B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. Use tarpaulins or drop cloths and masking tape and paper when working above or adjacent to finished work.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

### 3.6 WOOD-FINISH-SYSTEM SCHEDULE

- A. General: Work specified herein is in addition to shop coats called for under other Sections. Products listed in the following schedule are generally those of “PPG” to establish the type and level of quality and paint type required. Also see article 2.1. All paint systems must conform to the MPI manual. If a paint system herein does not comply with the MPI, contact the Architect for clarification.
- B. Interior Wood Trim, Stripping and Finish, and Casework with Wood Trim:
  - 1. General: All exposed wood trim and finish lumber surfaces in occupied spaces, which are not otherwise specified under work of other Sections to be factory finish, shall be finished under work of this Section by the following systems.
  - 2. Finish: All Wood and Hardwood Members/Surfaces indicated to be Stained, including hardwood trim and hardwood veneer plywood for Division 6 Section “Interior Finish Carpentry” and Division 12 Section “Manufactured Wood Casework” (unless otherwise specified therein) noted on the Drawings as “stain”, “stained” or “stain and lacquer”. :
    - a. Fine sand to provide clean smooth base.
    - b. Apply 3 coats of RYMAR RAIN WET SHEEN PIGMENTED WOOD SEALER. Allow minimum of 30 minutes between coats.
  - 3. Wood Trim, Plywood Equipment Panels and Other Wood Items Noted on Drawings to be Painted: See Division 09 Section “Interior Painting”.
- C. Interior Wood Veneer Faced Wood Doors: Doors are to be factory finished. Field seal top and bottom of doors with PPG “REZ Interior Acrylic Polyurethane Gloss Finish, 77-45” series.
- D. Exterior Wood Siding,
  - 1. General: All exposed wood siding and wood trim:
    - a. Fine sand to provide clean, smooth base.
    - b. Apply two coats of PPG SIKKENS “CETOL LOG & SIDING” finish, allowing a minimum of 24 hours between coats. Brush marks in the direction of wood grain.

END OF SECTION 099300

1 SECTION 099600 - HIGH-PERFORMANCE COATINGS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes surface preparation and application of high-performance coating systems on  
8 the substrates indicated in part 2 of this Section.

9 B. Related Requirements:

- 10 1. Division 05 Sections for shop priming of metal substrates with primers specified in this  
11 Section.  
12 2. Division 09 painting Sections for general field painting.  
13 3. Division 13 Section "Metal Building Systems" for preparation, priming, and painting of  
14 specified steel components.

15 1.3 DEFINITIONS

- 16 A. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

- 17 B. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

18 1.4 ACTION SUBMITTALS

- 19 A. Product Data: For each type of product indicated. Include preparation requirements and  
20 application and cure instructions.

- 21 B. Samples: Provide for each type of topcoat product indicated. Samples will not be returned  
22 other than copies of approved sample finishes (draw-downs):

- 23 1. Color Sample Box: If requested by the Architect, submit one manufacture's color box  
24 with the full line of color samples in approximately 4 x 6 inch sample size.  
25 2. Color Wheel: If requested by the Architect, submit one full spectrum color wheel for  
26 each of the various coatings involved, for Architect's use for color selections; submit  
27 additional color wheels or the like for specialty coatings of other manufactures where  
28 different from general paint supplier.  
29 3. Applied Finish Samples: Submit samples in accordance with the following as directed:

- 30 a. Where requested, and before commencing work, prepare samples on final substrate;  
31 size not less than 12" x 12".

- b. Prepare (4) sets of 8 ½" x 11" paint sample cards of each color, texture, and sheen.
- c. Three samples each lumber species, each 2 feet long, for "stain samples."
- d. Furnish additional required samples until colors, finishes, textures are reviewed and accepted by the Architect (followed by written authorization to proceed).
- e. Mark on each sample the paint manufacturer's name, color name, and color code formula.
- f. Allow ample time for the selection of colors; do not work until colors are approved.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Coatings: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

#### 1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each coating system specified in Part 3.
  - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
  - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
  - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. See Quality Assurance requirements of Division 9 Sections “Interior Painting,” “Exterior Painting” and “Staining and Transparent Finishing” which also apply to this section.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

#### 1.8 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. Manufacturers: Tnemec has been used in this specification as a basis of design. Other manufacturers, with equivalent products, may submit as a substitution as provided during the bid process under the Instructions to Bidders and specification section 012500.

B. Products: Subject to compliance with requirements, provide product listed in other Part 2 articles for the paint category indicated.

#### 2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and are listed in "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.

3. Provide products of same manufacturer for each coat in a coating system.
4. Where the factory prime coat is not compatible with the specified primer and/or finish coats, provide a seal coat to make surface ready for specified primer and finish coats.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior coatings applied at project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: 250 g/L.
5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
6. Pre-Treatment Wash Primers: 420 g/L.
7. Floor Coatings: 100 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.

D. Colors: As selected by Architect from manufacturer's full range, or custom colors where requested by Architect. Also see Color Schedule on drawings.

### 2.3 EXTERIOR HIGH-PERFORMANCE COATING SYSTEMS

#### A. Ferrous Metal:

1. Locations: All exterior ferrous metal, including but not limited to (except where indicated on drawings specifically to remain galvanized without a finish):
  - a. Exposed structural steel (of all types), including Pre-engineered Metal Building Systems.
  - b. Steel gates, except those noted to be left bare galvanized.
  - c. Exposed steel decking, unless noted to remain bare galvanized.
  - d. Steel pipe bollards, unless not to remain bare galvanized.
  - e. Custom fabricated ornamental railings, fencing, and gates.
  - f. Other miscellaneous exposed steel noted or scheduled to be painted. See Color Schedule on the drawings.
2. Finish:
  - a. Primer: This coat may be factory applied and touched-up in the field. Coordinate with Division 5 Sections.
    - 1) "Tnemec Seires 394-250 PerimePrime, 2.5 to 3.5 mils DFT.
  - b. Intermediate Coat:
    - 1) "FC 27 Typoxy, 3.0 to 5.0 mils DFT.
  - c. Color Coat:
    - 1) "Tnemec Series 73 Endura-Shield, 3.0 to 5.0 mils DFT.



B. Nonferrous Metal: Provide the following finish systems over exterior nonferrous-metal surfaces scheduled or noted to be painted:

1. Primer: This coat may be factory applied and touched-up in the field. Coordinate with Division 05 Sections. This coat may be factory applied and touched-up in the field. Coordinate with Division 05 Sections.
  - a. “Tnemec Series FC27 Typoxy, 3 to 3.5 mils DFT.
2. Color Coat: Tnemec Series 73 Endura-Shield, 2.0 to 3.0 mils DFT.

C. Hollow Metal Doors & Door Frames:

1. Surfaces to be Painted: Include exposed surfaces - both faces, ends, edges and stops (all sides) of all exterior hollow metal doors and exposed frame surfaces. Coordinate with Section 088000 to glaze after painting.
2. Manufacturer: Tnemec, or equivalent high performance coating, or approved substitute during the bid process per the Instructions to Bidders and specification Section 012500.
3. Field Prime Coat: “Tnemec Series FC 27 Typoxy”, 2 to 3 mils dry film thickness. Apply to all exposed surfaces.
4. Field Finish Coat: “Tnemec Sereis 73 Endura-Shield”, 2 to 3 mils dry film thickness, or, Apply to all exposed surfaces.

2.4 INTERIOR HIGH-PERFORMANCE COATING SYSTEMS

A. Hollow Metal Doors and Hollow Metal Frames: See Section “Interior Painting”.

B. Ferrous Metal

1. Locations: All interior ferrous metal, including but not limited to (do not paint stainless steel unless specifically noted):
  - a. Exposed structural steel (of all types).
  - b. Decorative steel
  - c. Other miscellaneous exposed steel.
2. Finish:
  - a. Primer: This coat may be factory applied and touched-up in the field. Coordinate with Division 5 Sections.
    - 1) “Tnemec Series 394-250 PerimePrime”, 2.5 to 3.5 mils DFT.
  - b. Intermediate Coat:
    - 1) “Tnemec Series 115 Uni-Bond DF, 2.0 to 4.0 mils DFT.
  - c. Color Coat:
    - 1) “Tnemec Series 1029 Enduratone, 2.0 to 3.0 mils DFT.

C. Nonferrous Metal: Where scheduled to be painted, provide same as above for ferrous metal. Confirm any special priming requirements with manufacturer and provide.

D. Metal Relite Frames, Doors & Door Frames, Access Doors, and Metal Frames at Wood Door Lites: Same as specified above for exterior hollow metal doors and frames.

## 2.5 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

### 3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings. Clean galvanized metal in accordance with ASTM D 6386.

G. Aluminum Substrates: Remove loose surface oxidation. Abrade 100% of surface to be painted with 3M Brown metal finish pad.

### 3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions, this specification section, and recommendations in SSPC Vol.1&II, "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for coating and substrate indicated.
2. System used shall be at the Contractor's discretion as necessary to produce the highest quality finish, unless a specific system is specified herein.
3. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
4. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
5. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Omit primer on metal surfaces that have been shop primed and touchup painted, if specifically allowed herein.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

- 1 D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush  
2 marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color  
3 breaks.

4 3.4 FIELD QUALITY CONTROL

- 5 A. Dry Film Thickness Testing: Owner may engage the services of a qualified NACE level 3  
6 testing and inspecting agency to inspect and test coatings for dry film thickness.

- 7 1. Contractor shall spot repair and restore coated surfaces damaged by testing.  
8 2. If test results show that dry film thickness of applied coating does not comply with  
9 coating manufacturer's written recommendations, Contractor shall pay for testing and  
10 apply additional coats as needed to provide dry film thickness that complies with coating  
11 manufacturer's written recommendations.

12 3.5 CLEANING AND PROTECTION

- 13 A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from  
14 Project site.

- 15 B. After completing coating application, clean spattered surfaces. Remove spattered coatings by  
16 washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- 17 C. Protect work of other trades against damage from coating operation. Correct damage by  
18 cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an  
19 undamaged condition.

- 20 D. At completion of construction activities of other trades, touch up and restore damaged or  
21 defaced coated surfaces.

22 END OF SECTION 099600

1 SECTION 101400 - SIGNAGE

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. This Section includes the following:

- 8 1. Dimensional characters.  
9 2. Plaques.  
10 3. Panel signs.  
11 4. Sign letters for exterior monument sign.  
12 5. Signage accessories.

- 13 B. Related Sections include the following:

- 14 1. Division 5 Section "Metal Fabrications" for sign posts at exterior vehicular signs.  
15 2. Division 5 Section "Metal Fabrications" for sheet metal at panel signs.  
16 3. Division 22 Sections for labels, tags, and nameplates for plumbing systems and  
17 equipment.  
18 4. Division 23 Sections for labels, tags, and nameplates for HVAC systems and equipment.  
19 5. Division 26 Sections for labels, tags, and nameplates for electrical equipment.  
20 6. Division 26 Section "Identification for Electrical Systems" for labels, tags, and  
21 nameplates for electrical equipment.  
22 7. Division 26 Sections for illuminated Exit signs.  
23 8. Division 26 Section "Lighting" for illuminated Exit signs.

24 1.3 DEFINITIONS

- 25 A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance  
26 Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and  
27 Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

28 1.4 ACTION SUBMITTALS

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

- 30 B. Shop Drawings: Show fabrication and installation details for signs.

- 31 1. Show sign mounting heights, locations of supplementary supports to be provided by  
32 others, and accessories.

2. Provide message list, typestyles, and graphic elements, including tactile characters, Braille, and layout for each sign.
3. Wiring Diagrams: Power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:

1. Aluminum.
2. Acrylic sheet.
3. Polycarbonate sheet.
4. Fiberglass sheet.
5. Die-cut vinyl characters and graphic symbols. Include representative samples of available typestyles and graphic symbols.

D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:

1. Panel Signs: 8 inches (150 mm) square including all components, materials, and border.
2. Dimensional Characters: Full-size Samples of each type of dimensional character (letter, number, and graphic element).
3. Aluminum: For each form, finish, and color, on 6-inch- (150-mm-) long sections of extrusions and squares of sheet at least 4 by 4 inches (100 by 100 mm).
4. Acrylic Sheet: 8 by 10 inches (200 by 250 mm) for each color required.
5. Back-Printed Acrylic: 8 x 10 inches with sample printed graphic.
6. Panel Signs: Not less than 12 inches (305 mm) square.
7. Accessories: Manufacturer's full-size unit.

E. Sign Schedule: Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.
- C. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1 current addition.

1. Interior Code Signage: Provide signage to meet requirements of accessibility regulations, and requirements of authorities having jurisdiction.

## 1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

C. Text Information Supplied by Owner (For all Signage): Copy/ text noted herein to be supplied by Owner during shop drawing process, Contractor shall provide Owner minimum 60 days advanced notice of when such information will be needed.

## 1.9 COORDINATION

A. Coordinate placement of anchorage devices with templates for installing signs.

## 1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.

b. Deterioration of embedded graphic image.

2. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.

- 1 B. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by  
2 aluminum producer and finisher for type of use and finish indicated, and with at least the  
3 strength and durability properties of Alloy 5005-H32.
- 4 C. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by  
5 aluminum producer and finisher for type of use and finish indicated, and with at least the  
6 strength and durability properties of Alloy 6063-T5.
- 7 D. Steel:
- 8 1. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating, either commercial  
9 or forming steel.
- 10 2. Steel Sheet: Cold-rolled, ASTM A 1008/A 1008M.
- 11 3. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type [304] [316],  
12 stretcher-leveled standard of flatness.
- 13 4. Steel Members Fabricated from Plate or Bar Stock: ASTM A 529/A 529M or  
14 ASTM A 572/A 572M, 42,000-psi (290-MPa) minimum yield strength.
- 15 5. For steel exposed to view on completion, provide materials having flat, smooth surfaces  
16 without blemishes. Do not use materials whose surfaces exhibit pitting, seam marks,  
17 roller marks, rolled trade names, or roughness.
- 18 E. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
- 19 F. Plaque Schedule: See Sign Schedule on Drawings, A70 Series sheets.

20 2.2 POST MOUNTED SITE SIGNAGE: See Sign Schedule on Drawings, A70 Series sheets.

- 21 A. Manufacturers: Any company meeting these specifications.

- 22 B. Handicap parking Stall Signs:

- 23 1. Provide for each handicap parking stall indicated on Drawings, of 1/8 inch aluminum,  
24 size as indicated, all corners rounded 1-inch radius, with all surfaces painted with  
25 approved reflectorized vinyl paint.
- 26 2. Sign background and back face shall be white, border and lettering green, symbol  
27 background blue, symbol white.
- 28 3. Signs shall have the International Symbol of Access, set on 6-inch square blue  
29 background, and the following wording located center above symbol:

30  
31 RESERVED PARKING

32  
33 And the following wording located centered below symbol:

34  
35 STATE DISABLED PARKING  
36 PERMIT REQUIRED

- 37 4. Lettering above symbol shall be 2 inches in height, spaced 1 inch between lines; style  
38 "Helvetica Medium", upper case.



C. Van Accessible Handicap Parking Stall Sign:

1. Provide “van accessible” handicap parking stall sign of 1/8 inch aluminum, 12 inches wide x 6 inches high, all corners rounded 1 inch radius, with all surfaces painted with approved reflectorized vinyl paint.
2. Sign background and back face shall be blue, border and lettering white.
3. Signs shall have the following wording centered within sign:

VAN  
ACCESSIBLE

4. Lettering shall be 1 ½ inches in height, spaced ¾ inch from border and between lines; style “Helvetica Medium”, upper case.
5. Border shall be 3/8 inch wide.

D. Traffic Control Signs:

1. Provide traffic control signs of types, number and locations as shown on site plans, conforming to manual on Uniform Traffic Conform Devices (MUTCD), of .080 inch aluminum, sizes as scheduled, all corners rounded with 1 inch radius, with all surfaces painted with approved reflectorized vinyl paint of colors indicated; refer also to Details in Section 10 and/or Section 72 of the Project Manual Volume II.
2. In addition, provide for each vehicle gate assembly “No Parking Fire Lane” sign 12 inches wide by 18 inches high in size.

2.3 DIMENSIONAL CHARACTERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. ACE Sign Systems, Inc.
2. Advance Corporation; Braille-Tac Division.
3. A. R. K. Ramos.
4. ASI-Modulex, Inc.
5. Bunting Graphics, Inc.
6. Charleston Industries, Inc.
7. Gemini Incorporated.
8. Grimco, Inc.
9. Innerface Sign Systems, Inc.
10. Metal Arts; Div. of L&H Mfg. Co.
11. Mills Manufacturing Company.
12. Mohawk Sign Systems.
13. Nelson-Harkins Industries.
14. Signature Signs, Incorporated.

15. Southwell Company (The).
16. Vertical Visual Solutions
17. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

D. Locations: For use at building interior and exterior, as indicated on Drawings.

E. Cutout Characters: Provide characters with square-cut, smooth[, eased] edges. Comply with the following requirements:

1. Aluminum Sheet: 0.25 inch (6.35 mm) thick.
  - a. Finish: Painted.
  - b. Color: As selected by Architect from manufacturer's full range.
2. Mounting: Adhesive Projected with concealed noncorroding studs, as indicated on Drawings for substrates encountered.

F. Dimensional Character Sign Schedule: See Sign Schedule on Drawings, A70 Series Sheets.

#### 2.4 PANEL SIGNS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. Vertical Visual Solutions.
2. Graphic Systems APCO Northwest.
3. Bunting Graphics, Inc.
4. Media Inc., Kent, WA.
5. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

D. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, complying with the following requirements:

1. Frosted Acrylic: 0.125 inches thick. P95 Frosted Acrylic.
2. Clear Acrylic with Subsurface Digital Print: 0.125 inches thick. P99 non-glare acrylic.
3. Colored Acrylic: 0.125 inches thick. P95 colored acrylic. Color to be chosen by Architect from manufacturer's full range of colors.
4. Edge Condition: Square cut.
5. Corner Condition: Square.
6. Mounting: Unframed.

- 1 a. Wall mounted with two-face tape.
- 2 b. Manufacturer's standard anchors for substrates encountered.
- 3 7. Fasteners: "Snake Eyes," tamper-proof stainless steel fasteners.
- 4 8. Color: As selected by Architect from manufacturer's full range.
- 5 9. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch (0.8 mm) above
- 6 surface with contrasting colors.
- 7 E. Exterior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under
- 8 installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally
- 9 from corner to corner, complying with the following requirements:
  - 10 1. Frosted Acrylic: 0.125 inches thick. P95 Frosted Acrylic with subsurface paint.
  - 11 Architect to select from Manufacturer's full range of colors.
  - 12 2. Colored Acrylic: 0.125 inches thick. P95 Colored Acrylic. Architect to select from
  - 13 manufacturer's full range of colors.
  - 14 3. Edge Condition: Square cut
  - 15 4. Corner Condition: Square.
  - 16 5. Mounting: Unframed.
- 17 a. Wall mounted.
- 18 b. Manufacturer's standard non-corroding anchors for substrates encountered.
- 19 6. Custom Paint Colors: Match Pantone color matching system.
- 20 7. Color: As selected by Architect from manufacturer's full range.
- 21 F. Site Panel Sign Frames:
  - 22 1. Face Panel: 0.125 inches thick. Aluminum with surface applied digital print. UV
  - 23 Lusterlam clear coat over print.
  - 24 2. Posts:
    - 25 a. Type: Double post
    - 26 b. Material: ASTM 221-90, 6063-T6 structural extruded aluminum alloy.
    - 27 c. Finish: Architect to select from manufacturer's standard colors.
    - 28 d. Height: 60 inches above grade.
    - 29 e. Base: Concrete base as required by manufacturer, minimum. 18 inches below
    - 30 grade with to flush at grade.
    - 31 f. Post Caps: Sealed post caps, aluminum.
- 32 G. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the
- 33 form of transparent covers with paper inserts printed by Owner.
  - 34 1. Furnish insert material and software for creating text and symbols for PC-Windows
  - 35 computers for Owner production of paper inserts.
  - 36 2. Furnish insert material cut-to-size for changeable message insert.
- 37 H. Tactile and Braille Sign: Manufacturer's standard process for producing text and symbols
- 38 complying with ADA-ABA Accessibility Guidelines and with ICC/ANSI A117.1. Text shall be
- 39 accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges
- 40 free from burrs and cut marks; Braille dots with domed or rounded shape.

1. Panel Material: Acrylic sheet.
2. Raised-Copy Thickness: Not less than 1/32 inch (0.8 mm).

I. Panel Sign Schedule: See Sign Schedule on Drawings, A70 Series Sheets.

1. Sign Type:

## 2.5 PLAQUES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. comparable product by one of the following:

1. A. R. K. Ramos.
2. ACE Sign Systems Inc.
3. Allen Markings
4. APCO Graphics, Inc.
5. Diskey Architectural Signage Inc.
6. Erie Landmark Company
7. Gemini Incorporated.
8. Matthews International Corporation; Bronze Division.
9. Metal Arts; Div. of L&H Mfg. Co.
10. Metallic Arts
11. Nelson-Harkins Industries.
12. Southwell Company (The).
13. Or approved substitute during the bid process per Specification Sections 00200 and 01631.

C. Cast Plaques: Provide castings free of pits, scale, sand holes, and other defects, as follows:

1. Plaque Material: Bronze.
2. Background Texture: Manufacturer's standard pebble texture.
3. Border Style: Square, polished.
4. Mounting: Rosettes and fasteners matching plaque finish for substrates encountered.
5. Size: For bidding purposes, assume 18 inches by 24 inches. Confirm with Architect via shop drawings.
6. Wording: To include JTA name, building name, dedication date, board member names, Architect's firm name, and General Contractor's firm name.

D. Plaque Schedule: See Sign Schedule on Drawings, A72.00 Series sheets.

## 2.6 ACCESSORIES

A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.7 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.8 FINISHES, GENERAL

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

2.9 ALUMINUM FINISHES

- A. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm), medium gloss.

2.10 STEEL FINISHES

- A. Surface Cold Rolled Steel: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."

2.11 ACRYLIC SHEET FINISHES

- A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that items, including anchor inserts, are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
  - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Interior Wall Signs: Install signs on walls where indicated, typically adjacent to latch side of door [where applicable], unless indicated otherwise. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Panel Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply. Attach panel signs to wall surfaces using methods indicated below:
  - 1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
  - 2. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces.
  - 3. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.
  - 4. High Bond Epoxy Mounting: Attach signs to exterior siding materials. Two-face tape may also be used for mounting while epoxy cures.
- C. Accessible Signage:
  - 1. Accessible Parking Stall Signs

- 1                   a.     Mount sign on steel pipe posts provided under Section 055000, located on posts 60
- 2                         inches above the floor of the parking space to the bottom of the sign.
- 3                   b.     Locate signs as directed by Architect at each accessible parking stall.
- 4                   2.     Accessible Building Access Sign: Apply international symbol of access sign to inside
- 5                         surface of entrance door lite in locations indicated or as directed by Architect.
- 6                   3.     Accessible / Room Access Signs:
- 7                         a.     Mount all international symbol-of-access room signs to room doors or walls as
- 8                         directed by Architect, at all designated accessible toilet rooms.
- 9                         b.     Securely anchor to door or wall construction as approved.
- 10                  D.     Traffic Control Signs
- 11                   1.     Mount the various traffic control signs on steel pipe posts provided under Section
- 12                         055000; sign type locations as indicated on Drawings.
- 13                   2.     Mount “No Parking Fire Lane” signs to vehicle gates as shown on Details, with signs at
- 14                         each gate leaf mounted back-to back.
- 15                   3.     Mount all other traffic control signs on post supports with each sign centered 54 inches
- 16                         above finish grade elevation.
- 17                   4.     Signs shall be mounted with two stainless steel thru-bolts each sign, complete with
- 18                         stainless steel nuts and washers; bolt heads shall be non-slotted roundhead type.
- 19                  E.     Letter Signage for Concrete/Masonry Structure: Turn over to applicable trade, together with
- 20                         manufacturer’s applicable installation data, for installation in concrete work specified under
- 21                         Section 033000.
- 22                  F.     Building Address Signage: Install on site monument sign as directed, mounted as specified
- 23                         herein above and approved.
- 24                  G.     Exterior signs installed on exterior walls shall have all holes and penetrations into wall sealed to
- 25                         prevent water entry.
- 26                  H.     Exterior signs installed on exterior walls shall have all holes and penetrations into wall sealed to
- 27                         prevent water entry.
- 28                  I.     Bracket-Mounted Signs: Provide manufacturer's standard brackets, fittings, and hardware for
- 29                         mounting signs that project at right angles from walls and ceilings. Attach brackets and fittings
- 30                         securely to walls and ceilings with concealed fasteners and anchoring devices to comply with
- 31                         manufacturer's written instructions.
- 32                  J.     Dimensional Characters: Mount characters using standard fastening methods to comply with
- 33                         manufacturer's written instructions for character form, type of mounting, wall construction, and
- 34                         condition of exposure indicated. Provide heavy paper template to establish character spacing
- 35                         and to locate holes for fasteners.
- 36                   1.     Flush Mounting: Mount characters with backs in contact with wall surface.
- 37                   2.     Projected Mounting: Mount characters at projection distance from wall surface indicated.
- 38                  K.     Cast-Metal Plaques: Mount plaques using standard fastening methods to comply with
- 39                         manufacturer's written instructions for type of wall surface indicated.

- SIGNAGE 101400 - 12



1 SECTION 102113 - TOILET COMPARTMENTS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Stainless Steel toilet compartments configured as toilet enclosures, and urinal screens.

9 B. Related Sections:

- 10 1. Division 05 Section "Metal Fabrications" for supports that attach floor-and-ceiling-  
11 anchored compartments and post-to-ceiling screens to overhead structural system.  
12 2. Division 09 Section "Non-Structural Metal Framing" for blocking and backing in metal  
13 framed walls.  
14 3. Division 10 Section "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers,  
15 grab bars, purse shelves, and similar accessories.

16 1.3 ACTION SUBMITTALS

- 17 A. Product Data: For each type of product indicated. Include construction details, material  
18 descriptions, dimensions of individual components and profiles, and finishes.

- 19 B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and  
20 attachments to other work.

- 21 1. Show locations of cutouts for compartment-mounted toilet accessories.  
22 2. Show locations of reinforcements for compartment-mounted grab bars.  
23 3. Show locations of centerlines of toilet fixtures.  
24 4. Show overhead support or bracing locations.

- 25 C. Samples for Initial Selection: For each type of unit indicated. Include Samples of hardware and  
26 accessories involving material and color selection.

- 27 D. Samples for Verification: For the following products, in manufacturer's standard sizes unless  
28 otherwise indicated:

- 29 1. Each type of material, color, and finish required for units, prepared on 6-inch- (152-mm-)  
30 square Samples of same thickness and material indicated for Work.  
31 2. Each type of hardware and accessory.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment, from manufacturer.
- B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1 for toilet compartments designated as accessible, and the requirements of the agency having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- B. Stainless-Steel Castings: ASTM A 743/A 743M.
- C. Plastic Laminate: NEMA LD 3, general-purpose HGS grade, 0.048-inch (1.2-mm) nominal thickness.

2.2 STAINLESS STEEL UNITS

A. Manufacturers: Subject to compliance with requirements, provide Bradley Corporation products or comparable product by one of the following:

1. American Sanitary Partition Corporation.
2. Ampco, Inc.
3. Bobrick Washroom Equipment, Inc.
4. General Partitions Mfg. Corp.
5. Knickerbocker Partition Corporation.
6. Partition Systems Incorporated of South Carolina.
7. Rockville Partitions Incorporated.
8. Shanahan's Limited.
9. Tex-Lam Manufacturing, Inc.
10. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500. As part of the substitution process, provide all information required by the References Section plus full color samples of all available compartment finishes. Colors must be satisfactory to Architect to be considered for substitution.

B. Toilet-Enclosure Style: Overhead braced.

1. Basis of Design: Bradley Series 500 "Sentinel" Stainless Steel.

C. Urinal-Screen Style: Wall hung.

D. Door, Panel, Screen, and Pilaster Construction: Stainless Steel.

1. 300 Series Stainless Steel with 5WL textured finish.
2. Edge: "Permaseal"™
3. Panels: 1 inch thick, constructed from 22 gauge stainless steel.
4. Doors: 1 inch thick constructed from 22 gauge stainless steel.
  - a. Corners welded underneath clip fixed to all corners.
  - b. 14 gauge welded reinforcements at the top and bottom hinge locations with factory installed concealed true gravity cam.

E. Pilaster Shoes and Sleeves (Caps): Fabricated from stainless-steel sheet, not less than 1-1/4-inch nominal thickness from 22 gauge stainless steel and 3 inches (76 mm) high, finished to match hardware.

F. Urinal-Screen Post: Manufacturer's standard post design of material matching the thickness and construction of pilasters; with shoe and sleeve (cap) matching that on the pilaster.

G. Brackets (Fittings):

1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.3 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless steel.
2. Hinges: Manufacturer's standard continuous, cam type that swings to a closed or partially open position.
3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Floor Bracing: Manufacturer's stainless steel floor attachment and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel.

## 2.4 FABRICATION

A. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

B. Urinal-Screen: Provide manufacturer's standard corrosion-resistant wall anchoring assemblies.

C. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging (unless indicated otherwise) doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

#### 1. Maximum Clearances:

- a. Pilasters and Panels: 1/2 inch (13 mm).
- b. Panels and Walls: 1 inch (25 mm).

- 1            2.    Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three  
2            brackets attached at midpoint and near top and bottom of panel.
- 3            a.     Locate wall brackets so holes for wall anchors occur in masonry or tile joints.  
4            b.     Align brackets at pilasters with brackets at walls.
- 5        B.    Floor-and-Ceiling-Anchored Units: Secure pilasters to supporting construction and level,  
6           plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when  
7           doors are in closed position.
- 8        C.    Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and  
9           plumb, rigid, and secured to resist lateral impact.
- 10    3.2    ADJUSTING
- 11        A.    Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's  
12           written instructions for proper operation. Set hinges on in-swinging doors to hold doors open  
13           approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging  
14           doors to return doors to fully closed position.
- 15    END OF SECTION 102113



1 SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Washroom accessories.  
9 2. Shower room accessories.  
10 3. Childcare accessories.  
11 4. Custodial accessories.

- 12 B. Owner-Furnished Material: As noted in this Section.

- 13 C. Related Sections:

- 14 1. Division 22 Sections for Underlavatory guards.

15 1.3 ACTION SUBMITTALS

- 16 A. Product Data: For each type of product indicated. Include the following:

- 17 1. Construction details and dimensions.  
18 2. Anchoring and mounting requirements, including requirements for cutouts in other work  
19 and substrate preparation.  
20 3. Material and finish descriptions.  
21 4. Features that will be included for Project.  
22 5. Manufacturer's warranty.

- 23 B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each  
24 accessory required.

- 25 1. Identify locations using room designations indicated.  
26 2. Identify products using designations indicated.

27 1.4 INFORMATIONAL SUBMITTALS

- 28 A. Warranty: Sample of special warranty.

- 1 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
2 America requirements.

3 1.5 CLOSEOUT SUBMITTALS

- 4 A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

5 1.6 QUALITY ASSURANCE

- 6 A. Source Limitations: For products listed together in the same Part 2 articles, obtain products  
7 from single source from single manufacturer.

- 8 B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70,  
9 by a qualified testing agency, and marked for intended location and application.

10 1.7 COORDINATION

- 11 A. Coordinate accessory locations with other work to prevent interference with clearances required  
12 for access by people with disabilities, and for proper installation, adjustment, operation,  
13 cleaning, and servicing of accessories.

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

16 1.8 WARRANTY

- 17 A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to  
18 replace mirrors that develop visible silver spoilage defects and that fail in materials or  
19 workmanship within specified warranty period.

- 20 1. Warranty Period: 15 years from date of Substantial Completion.

21 PART 2 - PRODUCTS

22 2.1 MATERIALS

- 23 A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness  
24 unless otherwise indicated.

- 25 B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products  
26 with finished edges; or ASTM B 30, castings.

- 27 C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-  
28 inch (0.9-mm) minimum nominal thickness.

- 29 D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.



- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

## 2.2 WASHROOM ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick and other products indicated herein or comparable product by one of the following:

- 1. A & J Washroom Accessories, Inc.
- 2. American Specialties, Inc.
- 3. Bradley Corporation.
- 4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
- 5. Tubular Specialties Manufacturing, Inc.
- 6. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

- B. Toilet Tissue (Roll) Dispenser (TPD) for single occupant restrooms:

- 1. Basis-of-Design Product: Bobrick model B-4388 “ConturaSeries”, recessed toilet tissue dispenser.
- 2. Description: Double-roll dispenser.
- 3. Mounting: Recessed.
- 4. Operation: As is standard for basis-of-design product.
- 5. Capacity: Designed for 5-inch- (127-mm-) diameter tissue rolls.
- 6. Material and Finish: Stainless steel, No. 4 finish (satin).

- C. Combination Towel (Folded) Dispenser/Waste Receptacle (PTDD):

- 1. Basis-of-Design Product: Bobrick model B-4369, “ConturaSeries” recessed paper towel dispenser and waste receptacle.
- 2. Description: Combination unit for dispensing C-fold or multifold towels, with removable waste receptacle.
- 3. Mounting: Recessed with projecting receptacle.
  - a. Designed for nominal 4-inch (100-mm) wall depth.
- 4. Minimum Towel-Dispenser Capacity: 350 C-fold or 475 multifold paper towels.
- 5. Minimum Waste-Receptacle Capacity: 3gal..
- 6. Material and Finish: Stainless steel, No. 4 finish (satin).
- 7. Liner: Reusable, vinyl waste-receptacle liner.
- 8. Lockset: Tumbler type for towel-dispenser compartment.

9. Accessory: Towel Mate

D. Paper Towel (Folded) Dispenser (PTD):

1. Basis-of-Design Product: Bobrick model B-35903, “TrimLineSeries” recessed paper towel dispenser.
2. Description: Unit for dispensing C-fold or multifold towels.
3. Mounting: Recessed.
  - a. Designed for nominal 4-inch (100-mm) wall depth.
4. Minimum Towel-Dispenser Capacity: 300 C-fold or 400 multifold paper towels.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
6. Lockset: Tumbler type for towel-dispenser compartment.
7. Accessory: Towel Mate

E. Liquid-Soap Dispenser (SD):

1. Basis-of-Design Product: Bobrick model B-4112, “ConturaSeries” wall-mounted soap dispenser.
2. Description: Designed for dispensing soap in liquid form.
3. Mounting: Wall mounted.
4. Capacity: 1200 mL.
5. Color: Stainless steel, No. 4 finish (satin).
6. Refill Indicator: Window type.

F. Grab Bar (GB):

1. Basis-of-Design Product: Bobrick model B-6806 for straight bars and model B-68137.99 for “L” shaped bars, except provide in sizes indicated on the drawings. Stainless steel grab bars with snap flange.
2. Mounting: Flanges with exposed fasteners.
3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
  - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. Outside Diameter: 1-1/2 inches (38 mm).
5. Configuration and Length: As indicated on Drawings.

G. Sanitary-Napkin Disposal Unit (SND):

1. Basis-of-Design Product: Bobrick model B-270 “ConturaSeries” surface-mounted sanitary napkin disposal.
2. Mounting: Surface mounted.
3. Door or Cover: Self-closing, disposal-opening cover.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

H. Toilet Seat-Cover Dispenser (TSCD):

1. Basis-of-Design Product: Bobrick model B-4221 “ConturaSeries” surfaced-mounted seat-cover dispenser.
2. Mounting: Surface mounted.
3. Minimum Capacity: 250 seat covers.
4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
5. Lockset: Tumbler type.

I. Purse Shelf (PS):

1. Basis-of-Design Product: Bobrick model B-296.
2. Description: Fixed shelf.
3. Nominal Size: 18 inches long by 6 inches wide.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

J. Mirror Unit without Shelf (all locations where a mirror is shown, unless noted otherwise):

1. Basis-of-Design Product: Bobrick model B-290, glass mirror with stainless steel angle frame.
2. Frame: Stainless-steel channel.
  - a. Corners: Manufacturer's standard.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
  - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
  - b. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
4. Size: As indicated on Drawings.

K. Robe Hook (RH):

1. Basis-of-Design Product: Bobrick model B-682, surface-mounted hat and coat hook.
2. Description: Double-flange unit.
3. Material and Finish: Stainless steel, bright polished.

2.3 SHOWER ROOM ACCESSORIES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick products indicated herein or comparable product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
6. Tubular Specialties Manufacturing, Inc.

7. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

B. Shower Curtain Rod:

1. Basis-of-Design Product: Bobrick model B-6047, “ClassicSeries” extra-heavy-duty shower curtain rod.
2. Description: 1-1/4 inch OD; fabricated from nominal 18 gauge thick stainless steel.
3. Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
4. Finish: No. 4 (satin).

C. Shower Curtain and Hooks:

1. Basis-of-Design Product: Bobrick model 204-1 stainless steel shower curtain hooks, and model 204 vinyl shower curtain.
2. Size: Minimum 6 inches (152 mm) wider than opening by 72 inches (1828 mm) high.
3. Material: Vinyl, minimum 0.006 inch (0.15 mm) thick, opaque, matte.
4. Color: White.
5. Grommets: Corrosion resistant at minimum 6 inches (152 mm) o.c. through top hem.
6. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

D. Folding Shower Seat:

1. Basis-of-Design Product: Bobrick model B-5181, reversible solid phenolic folding shower seat.
2. Configuration: L-shaped seat, designed for wheelchair access.
3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
4. Mounting Mechanism: Stainless steel, No. 4 finish (satin).
5. Dimensions: 33 inches wide, projecting 22-5/16 inches from the wall.

E. Folding Dressing Seat:

1. Basis-of-Design Product: Bobrick model B-5191, solid phenolic folding shower/dressing area seat.
2. Configuration: Rectangular seat.
3. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
4. Mounting Mechanism: Stainless steel, No. 4 finish (satin).
5. Dimensions: 18 inches wide, projecting 15-13/16 inches from the wall.

F. Soap Dish:

1. Basis-of-Design Product: Bobrick model B-B-680, surface-mounted soap dish.
2. Description: Without washcloth bar.
3. Mounting: Surface mounted.
4. Material and Finish: Stainless steel, bright polished.

2.4 CUSTODIAL ACCESSORIES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick product indicated on Drawings or comparable product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bradley Corporation.
4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
5. Tubular Specialties Manufacturing, Inc.
6. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

B. Mop and Broom Holder:

1. Basis-of-Design Product: Bobrick model B-239, utility shelf with mop/broom holders and rag hooks.
2. Description: Unit with shelf, hooks and holders.
3. Length: 34 inches (865 mm).
4. Hooks: Four.
5. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, No. 4 finish (satin).

a. Shelf: Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel.

2.5 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

- 1      B.    Remove temporary labels and protective coatings.
- 2      C.    Clean and polish exposed surfaces according to manufacturer's written recommendations.
- 3    END OF SECTION 102800

1 SECTION 104416 - FIRE EXTINGUISHERS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire  
8 extinguishers.

- 9 B. Related Sections:

- 10 1. Division 10 Section "Fire Extinguisher Cabinets."

11 1.3 ACTION SUBMITTALS

- 12 A. Product Data: For each type of product indicated. Include rating and classification, material  
13 descriptions, dimensions of individual components and profiles, and finishes for fire  
14 extinguisher and mounting brackets.

- 15 B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire  
16 protection cabinet schedule to ensure proper fit and function.

17 1.4 INFORMATIONAL SUBMITTALS

- 18 A. Warranty: Sample of special warranty.

- 19 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
20 America requirements.

21 1.5 CLOSEOUT SUBMITTALS

- 22 A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

23 1.6 QUALITY ASSURANCE

- 24 A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable  
25 Fire Extinguishers."

- 1 B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent  
2 testing agency acceptable to authorities having jurisdiction.

3 1.7 COORDINATION

- 4 A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and  
5 function.

6 1.8 WARRANTY

- 7 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or  
8 replace fire extinguishers that fail in materials or workmanship within specified warranty  
9 period.

- 10 1. Failures include, but are not limited to, the following:

- 11 a. Failure of hydrostatic test according to NFPA 10.  
12 b. Faulty operation of valves or release levers.

- 13 2. Warranty Period: Six years from date of Substantial Completion.

14 PART 2 - PRODUCTS

15 2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- 16 A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and each mounting  
17 bracket indicated.

- 18 1. Manufacturers: Subject to compliance with requirements, provide products by one of the  
19 following:

- 20 a. Amerex Corporation.  
21 b. Ansul Incorporated; Tyco International Ltd.  
22 c. Badger Fire Protection; a Kidde company.  
23 d. Buckeye Fire Equipment Company.  
24 e. Fire End & Croker Corporation.  
25 f. J. L. Industries, Inc.; a division of Activar Construction Products Group.  
26 g. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.  
27 h. Larsen's Manufacturing Company.  
28 i. Moon-American.  
29 j. Pem All Fire Extinguisher Corp.; a division of PEM Systems, Inc.  
30 k. Potter Roemer LLC.  
31 l. Pyro-Chem; Tyco Safety Products.  
32 m. Or approved substitute during the bid process per the Instructions to Bidders and  
33 Section 012500.



- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

1. For use at all locations and quantities as shown on the drawings.

## 2.2 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Amerex Corporation.
- b. Ansul Incorporated; Tyco International Ltd.
- c. Badger Fire Protection; a Kidde company.
- d. Buckeye Fire Equipment Company.
- e. Fire End & Croker Corporation.
- f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
- g. Larsen's Manufacturing Company.
- h. Potter Roemer LLC.
- i. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

2. For use at all locations and quantities as shown on the drawings where a fire extinguisher cabinet is not shown, or FEB (Fire Extinguisher and Bracket) is indicated.

- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

- a. Orientation: Vertical.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

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

1    3.2        INSTALLATION

2        A.    General:    Install fire extinguishers and mounting brackets in locations indicated and in  
3                compliance with requirements of authorities having jurisdiction.

4                1.    Mounting Brackets:    54 inches (1372 mm) above finished floor to top of fire  
5                                extinguisher, unless indicated otherwise on the drawings or unless a different height is  
6                                required by the agency having jurisdiction.

7        B.    Mounting Brackets:    Fasten mounting brackets to surfaces, square and plumb, at locations  
8                indicated.

9    END OF SECTION 104416

1 SECTION 105113 - METAL LOCKERS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Heavy-duty metal lockers.  
9 2. Heavy-duty cage lockers.  
10 3. Locker benches.

- 11 B. Related Section:

- 12 1. Division 05 and 09 Sections "Cold-Formed Metal Framing" and "Non-Structural Metal  
13 Framing" for coordination of framing, backing and blocking.

14 1.3 ACTION SUBMITTALS

- 15 A. Product Data: For each type of product indicated. Include construction details, material  
16 descriptions, dimensions of individual components and profiles, and finishes for each type of  
17 metal locker and bench.

- 18 B. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments  
19 to other work.

- 20 1. Show locker trim and accessories.  
21 2. Include locker identification system and numbering sequence.

- 22 C. Samples for Initial Selection: For units with factory-applied color finishes.

- 23 D. Samples for Verification: For metal lockers and locker benches, in manufacturer's standard  
24 sizes.

25 1.4 INFORMATIONAL SUBMITTALS

- 26 A. Qualification Data: For qualified Installer.

- 27 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
28 America requirements.

C. Warranty: Sample of special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Full-size units of the following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:

- a. Locks.
- b. Identification plates.
- c. Hooks.

#### 1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain metal lockers, locker benches, and accessories from single source from single manufacturer.

C. Regulatory Requirements: Where metal lockers and benches are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1, and the requirements of the agency having jurisdiction.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

B. Deliver master and control keys to Owner by registered mail or overnight package service.

#### 1.9 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.10 COORDINATION

- A. Coordinate sizes and locations of bases for metal lockers.
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Faulty operation of latches and other door hardware.
  - 2. Damage from deliberate destruction and vandalism is excluded.
  - 3. Warranty Period for All-Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
- B. Expanded Metal: ASTM F 1267, Type II (flattened), Class I, 3/4-inch (19-mm) steel mesh, with at least 70 percent open area.
- C. Stainless-Steel Sheet: ASTM A 666, Type 304.
- D. Extruded Aluminum: ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated.
- E. Steel Tube: ASTM A 500, cold rolled.
- F. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- G. Anchors: Material, type, and size required for secure anchorage to each substrate.
  - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls, and elsewhere as indicated, for corrosion resistance.
  - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.2 HEAVY-DUTY METAL LOCKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. DeBourgh Mfg. Co.; Sentry Corridor/Personnel Lockers.
  2. List Industries Inc.; Marquis Protector Single-Point Latch Corridor Lockers.
  3. Lyon Workspace Products; All-Welded Lockers.
  4. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.
- B. Locker Arrangement: Sloped top, double tier as indicated on Drawings.
- C. Size: 12" wide x 20" deep x 72" high.
- D. Body: Assembled by welding body components together. Fabricate from unperforated, cold-rolled steel sheet with thicknesses as follows:
1. Tops, Bottoms, and Sides: 0.0528 inch thick.
  2. Backs: 0.0428 inch thick.
  3. Shelves: 0.0528 inch thick, with double bend at front and single bend at sides and back.
- E. Frames: Channel formed; fabricated from 0.0528-inch- thick, cold-rolled steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.
1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- F. Doors: One-piece; fabricated from 0.0677-inch- thick, cold-rolled steel sheet; formed into channel shape with double bend at vertical edges, and with right-angle single bend at horizontal edges.
1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
  2. Door Style: Vented panel as follows:
    - a. Louvered Vents: Not less than six louver openings at top and bottom for single-tier, three louver openings at top and bottom for double-tier lockers.
    - b. Security Vents: Manufacturer's standard, stamped horizontal or vertical.
    - c. Perforated Vents: Manufacturer's standard shape and configuration.
- G. Hinges: Self-closing; welded to door and attached to door frame with not less than 2 factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Continuous Hinges: Manufacturer's standard, steel continuous hinge.
- H. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry resistant.
1. Multi-point Latching: Finger-lift latch control designed for use with built-in combination locks or padlocks; positive automatic and prelocking.
    - a. Latch Hooks: Equip doors 48 inches and higher with 3 latch hooks and doors less than 48 inches high with 2 latch hooks; fabricated from minimum 0.1116-inch-thick steel; welded to full-height door strikes; with resilient silencer on each latch hook.

- 1                   b.     Latching Mechanism: Manufacturer's standard rattle-free latching mechanism and
- 2                         moving components isolated to prevent metal-to-metal contact and incorporating a
- 3                         prelocking device that allows locker door to be locked while door is open and then
- 4                         closed without unlocking or damaging lock or latching mechanism.
- 5        I.     Built-in Combination Locks: Key-controlled, three-number dialing combination locks; capable
- 6               of at least five combination changes made automatically with a control key.
- 7               1.     Bolt Operation: Automatically locking spring bolt.
- 8        J.     Equipment: Equip each metal locker with identification plate and the following, unless
- 9               otherwise indicated:
- 10            1.     Shelf, one double-prong ceiling hook, and two single-prong wall hooks.
- 11        K.     Accessories:
- 12            1.     Continuous Sloping Tops: Fabricated from minimum 0.0428-inch- thick, cold-rolled
- 13               steel sheet; approximately 20-degree pitch.
- 14            a.     Closures: Vertical-end type.
- 15            2.     Filler Panels: Fabricated from 0.0428-inch- thick, cold-rolled steel sheet.
- 16            3.     Boxed End Panels: Fabricated from 0.0528-inch- thick, cold-rolled steel sheet.
- 17        L.     Finish: Baked enamel.
- 18            1.     Color(s): As selected by Architect from manufacturer's full range.

## 2.3 HEAVY DUTY CAGE LOCKERS

- A.     Location: Maintenance Shop Toilet Room
- B.     Locker Arrangement: Sloped top, single tier.
- C.     Type: DeBourgh "Varsity Locker" or equivalent from an approved manufacturer.
1.     Size 24" wide x 20" deep x 72" high.
- D.     Body: Form tops and bottoms from minimum 0.0598-inch- thick steel sheet.
1.     Solid Backs: Form from minimum 0.0478-inch- thick, solid steel sheet; flanged for
- double thickness at back vertical corners.
2.     Expanded-Metal Sides and Intermediate Partitions: Form from minimum 0.0897-inch-
- thick expanded metal; welded to minimum 0.1046-inch- thick steel angle or minimum
- 0.0598-inch- thick, steel channel frame.
- E.     Frames: Form welded frames from minimum 0.0598-inch- thick, steel sheet channels or
- minimum 0.1046-inch- thick steel angles.
1.     Latch Hooks: Form from minimum 0.1046-inch- thick steel; welded or riveted to door
- frames.
2.     Cross Frames: Form intermediate channel cross frames between tiers from minimum
- 0.0598-inch- thick steel sheet. Weld to vertical frame members.
- F.     Expanded-Metal Doors: Form doors from minimum 0.0897-inch- thick expanded metal;
- welded to minimum 0.1046-inch- thick steel angle frame, with manufacturer's standard, steel
- sheet lock panel welded to each side of door.

1. Reinforcement: Brace inner face of 24-inch- wide single-tier doors.
  2. DeBourgh Formed Diamond Perforated 37% ventilation or equivalent from an approved manufacturer
  - G. Shelves: Provide hat shelf in single-tier units, fabricated from minimum 0.0598-inch- thick formed-steel sheet; flanged on all edges.
  - H. Continuous Hinges: Manufacturer's standard, steel continuous hinge, side or mounted to door and frame.
  - I. Projecting Turn-Handle and Latch: Manufacturer's standard three-point cremone-type latch, consisting of two steel rods or bars engaging frame at top and bottom, and center latch engaging strike jamb, with provisions for padlock.
- 2.4 FABRICATION
- A. Fabricate metal lockers square, rigid, and without warp and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
    1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
    2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
  - B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.
  - C. All-Welded Construction: Factory pre-assemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory-weld main locker groups into one-piece structures. Grind exposed welds flush.
  - D. Accessible Lockers: Fabricate as follows:
    1. Locate bottom shelf no lower than 15 inches (381 mm) above the floor.
    2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches (1219 mm) above the floor.
  - E. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.
  - F. Coat Rods: Fabricated from 1-inch- (25-mm-) diameter steel, chrome finished.
  - G. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
  - H. Continuous Sloping Tops: Fully boxed and attached at factory with concealed fasteners finished to match lockers.
    1. Sloping-top corner fillers, mitered.



- I. Recess Trim: Fabricated with minimum 2-1/2-inch (64-mm) face width and in lengths as long as practical; finished to match lockers.
- J. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.
- K. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
  - 1. Provide one-piece panels for double-row (back-to-back) locker ends.
- L. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

## 2.5 STEEL SHEET FINISHES

- A. Factory finish steel surfaces and accessories except stainless-steel and chrome-plated surfaces.
- B. Baked Pure TGIC Polyester Powder Coat Finish: Immediately after cleaning, pretreating, and phosphatizing, apply manufacturer's standard thermosetting TGIC finish. Comply with paint manufacturer's written instructions for application, baking, and minimum dry film thickness.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install level, plumb, and true; shim as required, using concealed shims.
  - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches (910 mm) o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
  - 2. Anchor single rows of metal lockers to walls near top and bottom of lockers, and of lockers and to floor.
  - 3. Anchor back-to-back metal lockers to floor.
- B. Angle-Iron All-Welded Metal Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.

C. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.

1. Attach hooks with at least two fasteners.

2. Attach door locks on doors using security-type fasteners.

3. Identification Plates: Identify metal lockers with identification indicated on Drawings.

a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.

b. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.

4. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.

5. Attach finished end panels with fasteners only at perimeter to conceal exposed ends of non-recessed metal lockers.

D. Freestanding Locker Benches: Place benches in locations indicated on Drawings.

### 3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

B. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.

C. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

1 SECTION 107500 - FLAGPOLES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes ground-mounted flagpoles made from aluminum.

- 8 B. Owner-Furnished Material: Flag(s).

- 9 C. Related Sections:

- 10 1. Division 26 Sections for site lighting fixtures.

11 1.3 PERFORMANCE REQUIREMENTS

- 12 A. Structural Performance: Flagpole assemblies, including anchorages and supports, shall  
13 withstand the effects of gravity loads, and the following loads and stresses within limits and  
14 under conditions indicated according to the following design criteria:

- 15 1. Seismic Loads: According to SEI/ASCE 7. See Structural General Notes on Drawings.  
16 2. Wind Loads: 100 mph (45 m/s) minimum, unless otherwise required by authorities  
17 having jurisdiction; 3-second gust speed at 33 feet (10 m) aboveground according to  
18 SEI/ASCE 7.  
19 3. Base flagpole design on polyester flags of maximum standard size suitable for use with  
20 flagpole or flag size indicated, whichever is more stringent.

21 1.4 ACTION SUBMITTALS

- 22 A. Product Data: For each type of product indicated. Include construction details, material  
23 descriptions, dimensions of individual components and profiles, operating characteristics,  
24 fittings, accessories, and finishes for flagpoles.

- 25 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
26 America requirements.

- 27 C. Shop Drawings: For flagpoles. Include plans, elevations, details, and attachments to other  
28 work. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and  
29 support.

- 30 1. Include section, and details of foundation system for ground-mounted flagpoles.

2. Include details of connections and mountings.

D. Delegated-Design Submittal: For flagpole assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Include loads, point reactions, and locations for attachment of flagpoles to building's structure.

#### 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

#### 1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

#### 1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain flagpole(s) as complete unit, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

A. General: Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Flagpole; a Kearney-National Inc. company.
2. Baartol Company.
3. Concord Industries, Inc.
4. Eder Flag Manufacturing Company, Inc.
5. Ewing Flagpoles.
6. Lingo Inc.; Acme Flagpole Company Division.
7. Millerbernd Manufacturing Company.
8. Morgan-Francis; Division of Original Tractor Cab Co., Inc.
9. PLP Composite Technologies, Inc.
10. Pole-Tech Company Inc.
11. U.S. Flag & Flagpole Supply, LP.

- 1           12.   USS Manufacturing Inc.  
2           13.   Or approved substitute during the bid process per the Instructions to Bidders and Section  
3               012500.

4   2.2       FLAGPOLES

- 5       A.   Flagpole Construction, General: Construct flagpoles in one piece if possible. If more than one  
6       piece is necessary, comply with the following:

- 7           1.   Fabricate shop and field joints without using fasteners, screw collars, or lead calking.  
8           2.   Provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

- 9       B.   Exposed Height: 40 feet (12 m).

- 10      C.   Aluminum Flagpoles: Provide cone-tapered flagpoles fabricated from seamless extruded tubing  
11      complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16  
12      inch (4.8 mm).

- 13      D.   Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, not less than  
14      0.064-inch- (1.6-mm-) nominal wall thickness. Provide with 3/16-inch (4.8-mm) steel bottom  
15      plate and support plate; 3/4-inch- (19-mm-) diameter, steel ground spike; and steel centering  
16      wedges welded together. Galvanize steel after assembly. Provide loose hardwood wedges at  
17      top of foundation tube for plumbing pole.

- 18      E.   Sleeve for Aluminum]Flagpole: Fiberglass foundation sleeve, made to fit flagpole, for casting  
19      into concrete foundation.

- 20           1.   Provide flashing collar of same material and finish as flagpole.  
21           2.   Provide units made from aluminum with same finish and color as flagpoles.  
22           3.   Provide ground spike at grade-mounted flagpoles.

23   2.3       FITTINGS

- 24      A.   Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to  
25      match flagpole-butt diameter.

- 26           1.   0.063-inch (1.6-mm) spun aluminum, finished to match flagpole.

- 27      B.   External Halyard: Ball-bearing, nonfouling, revolving truck assembly of cast metal with  
28      continuous 5/16-inch- (8-mm-) diameter, braided polypropylene halyard and 9-inch (228-mm)  
29      cast-metal cleats with fasteners. Finish exposed metal surfaces to match flagpole.

- 30           1.   Provide two halyards and two cleats at each flagpole.  
31           2.   Provide cast-metal cleat covers, finished to match flagpole, secured with cylinder locks.  
32           3.   Provide halyard covers consisting of a 2-inch (50-mm) channel, 60 inches (1500 mm)  
33               long, finished to match flagpole.  
34           4.   Halyard Flag Snaps: Provide two stainless-steel swivel snap hooks per halyard.

- 35           a.   Provide with neoprene or vinyl covers.

2.4 MISCELLANEOUS MATERIALS

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.
- B. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.
- C. Sand: ASTM C 33, dry fine sand.
- D. Elastomeric Joint Sealant: Single-component nonsag urethane joint sealant complying with requirements in Division 07 Section "Joint Sealants" for Use NT (nontraffic) and for Use M, G, A, and, as applicable to joint substrates indicated, for Use O.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, including foundation; accurate placement, pattern, orientation of anchor bolts, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.
- B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.

- C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.
- D. Place concrete, as specified in Division 03 Section "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use nonstaining curing compound.
- E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

### 3.3 FLAGPOLE INSTALLATION

- A. General: Install flagpoles where shown and according to Shop Drawings and manufacturer's written instructions.
- B. Ground Set: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure. Install flagpole, plumb, in foundation tube.
  - 1. Foundation Tube: Place tube seated on bottom plate between steel centering wedges and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION 107500





1 SECTION 109900 - MISCELLANEOUS SPECIALTIES & EQUIPMENT

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and  
5 Division 01 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section includes:

- 8  
9 1. Fire Department Key box (Knox Box).  
10 2. Corner guards.  
11 3. Owner Furnish, Contractor Installed (FOIC) Equipment.
- 12 B. Related Sections
- 13 1. Division 05 Section “Cold-Formed Metal Framing” for metal backing and  
14 blocking.  
15 2. Division 09 Section “Non-Structural Metal Framing” for metal backing and  
16 blocking.  
17 3. Division 22 Sections for plumbing connections to sinks.  
18 4. Electrical service and connections for illuminated units are specified in Division  
19 26.

20 1.3 ACTION SUBMITTALS

- 21 A. Product Data: Include manufacturer's construction details relative to materials,  
22 dimensions of individual components, profiles, and finishes. Include manufacturer's  
23 data substantiating that materials comply with requirements indicated.

- 24 B. Shop Drawings: Include large-scale sections of typical members and other components.  
25 Show anchors, grounds, reinforcement and layout, and indicate finishes.

- 26 1. Include setting drawings, templates, and directions for installation of anchor bolts  
27 and other anchorages to be installed as a unit of Work in other Sections.

- 28 C. Samples: Provide the following samples as noted below:

- 29 1. Samples for verification of color, pattern, and texture selected and compliance  
30 with requirements indicated.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is an authorized representative of the specialty product manufacturer for installation and maintenance of the manufacturer's products.

1. The Installer shall be capable of providing replacement message strips within 10 working days of receipt of an order.

B. Fire Performance Characteristics: Provide materials with surface burning characteristics indicated below, as determined by testing assembled materials composed of facings and backings identical to those required in this section, in accordance with ASTM E 84, by a testing organization acceptable to authorities having jurisdiction and provide as they request.

1. Flame Spread: 25 or less.
2. Smoke Developed: 10 or less.

1.5 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 MATERIALS/PRODUCTS

A. General: Supplier shall be responsible for furnishing all components required for complete installation of products including anchors, other necessary accessories / fasteners for anchorage as required for particular conditions of installation in each case.

B. Fire Department Key (Knox Box): Furnish Supra Products, Inc., "Supra S5" key box, or approved. Verify acceptability of this or other units with local jurisdiction. Provide one for each building. Field-verify location with Architect prior to installation.

C. Stainless Steel Corner Guards: Pawling "Pro-Tek" model CG-50" stainless steel corner guard, or approved substitute during the bid process per the Instructions to Bidders and Section 012500, complete with manufacturer's recommended matching stainless steel fasteners.

1. Provide in 3-1/2" x 3-1/2" x 16 gauge Type 304 satin stainless steel.
2. Height: 8'-0", unless indicated otherwise on the drawings.
3. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

D. Owner Furnished (FOIC) Equipment: Obtain from Owner the following FOIC (furnished by Owner, installed by Contractor) equipment as specified herein; for all locations indicated on Drawings for each respective equipment item:

1. Certain shop equipment, see Equipment Specifications.
2. Other items indicated on drawings.
3. Generator – see Electrical Specifications.

G. Building Plague:

### PART 3 - EXECUTION

#### 3.1 JOB CONDITIONS - INSPECTION/PREPARATION

##### A. General

1. Time delivery and installation of products to avoid delaying other trades whose work is dependent on or affected by such products, and to comply with protection and storage requirements.
2. Verify that conditions are correct, proper for installation of products.
3. Verify job dimensions, be responsible for same.
4. Ascertain correctly, location and arrangement of anchorage required to accommodate work.
5. Coordinate with other trades where necessary to make provisions for installation.
6. For work specified to be installed, do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer.

#### 3.2 INSTALLATION

##### A. General

1. Do not install products which are observed to be defective in any way.
2. Securely anchor products/accessories in accurate locations; install in perfect alignment, free from warp, twist or distortion, plumb, level and true, in accord with final shop drawings, manufacturer's instructions and recommendations for particular conditions of installation in each case, except where more stringent requirements are indicated or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of work.
3. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

B. Fire Department Key Box: Install box securely to wall construction in locations as directed, installed in accordance with manufacturer's instruction sheets.

- 1 C. TV Monitor Brackets: Install brackets where shown, at heights indicated, in proper  
2 alignment, plumb, level and true, in accordance with the manufacturer's  
3 recommendations, fastened securely into building construction. For wood framed  
4 walls, fasten into center of studs and/or solid 2x or larger blocking with lag  
5 screws/bolts, two studs minimum, as recommended by the manufacturer to support the  
6 loads imposed. For concrete or masonry, fasten with expansion anchors of appropriate  
7 size and type, as recommended by the manufacturer to support the loads imposed.
- 8 D. Electric Operated Projection Screen: Install screen assembly securely anchored to  
9 support structure construction in location shown on Drawings, installed in accordance  
10 with manufacturer's instruction sheets, complete, ready for electrical connections by  
11 electrical subcontractor.
- 12 1. Testing and Inspection: Operate each screen 3 times to ensure viewing surfaces  
13 extend and retract through full range of motion.
- 14 a. Verify controls, limit switches, automatic doors, and other components  
15 function as designed and meet project requirements.
- 16 b. Ensure viewing surface raising operation fully engages and lifts screen  
17 closure door into closed position.
- 18 c. Adjust motors, controls and components to allow for smooth, unobstructed  
19 screen operation.
- 20 2. Protection:
- 21 a. Protect electrically operated projection screens from damage during  
22 construction in accordance with Section 017300, "Execution".
- 23 b. Repair damage to adjacent materials caused by electrically operated  
24 projections screen work.
- 25 E. Bike Racks: Thicken concrete slab to accept in-ground bike posts. Cast sleeve to  
26 accept posts, and grout in place with non-shrink grout. For existing slabs, core slab and  
27 grout in place.
- 28 F. Stainless Steel Work Tables and Sink Units: Install assembly following the  
29 manufacturers printed instructions, securely anchored to support building construction  
30 in location shown on Drawings, complete, level and ready for plumbing faucets and  
31 connections.
- 32 G. Corner Guards: Install as recommended by manufacturer, using stainless steel  
33 fasteners. Provide at locations shown on drawings. Install at heights indicated.
- 34 H. Drying Racks: Install as recommended by manufacturer, using manufacturers  
35 recommended fasteners. Coordinate with other divisions to make sure wall backing is  
36 provided. Install level, securing attached to wall for maximum load carrying capability.  
37 Provide at locations shown on drawings. Install at heights indicated.
- 38

I. Owner Furnished (FOIC) Equipment

1. Do not install accessories which are observed to be defective in any way.
2. Securely anchor equipment in accurate locations, ready for mechanical and electrical connections, as applicable. Install in proper alignment, free from warp, twist or distortion, plumb, level and true, in accord with final shop drawings, manufacturer's instructions and recommendations for particular conditions of installation in each case, except where more stringent requirements are indicated or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of work.

J. Verify placement of floor/roof structure mounted brackets in field to avoid ducts, conduits, etc. above suspended ceilings, and provide necessary length of mounting yoke, and all required accessories.

K. Modify suspended ceilings as required to accommodate new brackets, and install escutcheons to cover hole.

3.3 PROTECTION

A. General: While installing products protect adjacent surfaces against damage, stains. Protect products during, after installation against damage of every nature so that there will be no indication of use or damage at time of final project acceptance.

3.4 CLEANING/REPAIRING

A. General

1. Remove manufacturer's temporary labels, protective coatings, marks of identification if provided; thoroughly wash surfaces, remove foreign material, polish metal surfaces.
2. Exposed finishes shall be free from scratches, dents, permanent discolorations and other defects in workmanship, material.
3. Except where use of field applied touch-up paint is allowed, remove and replace damaged parts, surfaces which are not free from imperfections, or which have been damaged during installation or thereafter before time of final project acceptance. Where approved, touch-up damaged areas in shop applied finish with field applied touch-up paint.
4. Leave entire work in neat, orderly, clean condition.

END OF SECTION 109900



## **SECTION 11 06 00**

### **EQUIPMENT SCHEDULE**

#### **PART 1 - GENERAL**

The following Equipment Schedule provides information on equipment shown on the Equipment 'Q' drawings. Equipment is listed numerically by mark number with the following information:

1. Mark # - All identical equipment items are assigned the same number. The Equipment Mark Number coordinates this schedule with EQ drawings and the specifications.
2. Item Description.
3. Spec Section - Identifies division or section where technical specifications for the equipment item can be found. NIC means "Not in Contract".
4. Procurement Method
  - a. CF/CI = Contractor Furnished/Contractor Installed.
  - b. OF/OI = Owner Furnished/Owner Installed.
  - c. OF/CI = Owner Furnished/Contractor Installed.
5. Submittals - Identifies type(s) of submittals required:
  - a. PD = Product Data
  - b. SD = Shop Drawings
  - c. OM = Operation and Maintenance Manuals
  - d. T = Training of Owner's personnel on specific equipment items
  - e. TR = Test Reports

## PART 2 - PRODUCTS

Mark	Description	Meth	Section	Submittals
1040	Bin unit, 66 opening	OF / OI	NIC	-
1113	Cabinet, 9 drawer, 59"	OF / OI	NIC	-
1130	Cabinet, computer, shop	OF / OI	NIC	-
1456	Rack, bulk storage, w/ deck	OF / OI	NIC	-
1611	Rack, wire	OF / OI	NIC	-
1635	Rack, tire bus/truck, 2 tier	OF / OI	NIC	-
1860	Workbench, severe use	OF / OI	NIC	-
2832	Vise, combination, swivel base, 5"	OF / OI	NIC	-
3304	Reel, vehicle exhaust, motor operated, w/ 6" hose	CF / CI	???	-
5645	Lift, axle, adj, 2 post, scissor, 60,000 lb	OF / CI	???	-
8070	Dispenser, fuel, single hose	CF / CI	???	-
8190	Drops, air/electric, trapeze	CF / CI	13 30 00	PD, SM
8210	Fuel management system	CF / CI	???	-
8526	Pump, air piston (ATF), 3", 5:1	CF / CI	???	-
8534	Pump, air piston (CG), w/ hoist, 4.25", 50:1	CF / CI	???	-
8567	Pump, air piston (EO), 3", 5:1	CF / CI	???	-
8586	Pump, diaphragm (EC)	CF / CI	???	-
8740	Hose Reel (ATF, CG, EC, EO)	CF / CI	???	-
8867	Tank, fiberglass, double wall, 2 commodities, 12,000 gallon	CF / CI	???	-
9355	Filter, mechanical, portable	CF / CI	NIC	-
11051	Cabinet, tool	OF / OI	NIC	-
13201	Tool box, mechanic, portable	OF / OI	NIC	-
14081	Rack, barrel storage	OF / OI	NIC	-
11401	Cabinet, flammable materials, large	OF / OI	NIC	-
13601	Rack, 3 shelf	OF / OI	NIC	-
16801	Shelving unit, 18"	OF / OI	NIC	-
21401	Charger, battery, portable (battery charging mobile cart)	OF / OI	NIC	-
21402	Charger, battery, portable (battery charging mobile cart)	OF / OI	NIC	-
21531	Compressor, air, upright (IR, Model KA6-15TAS)	OF / CI	NIC	-
22051	Drill Press, floor mounted (Jet)	OF / OI	NIC	-
22601	Grinder, bench mounted	OF / OI	NIC	-
24401	Mounter/demounter, tire, automotive (Model #:?)	OF / OI	NIC	-
24551	Mounter/demounter, tire, bus (Coats Heavy Duty, Model GAE0901190)	OF / OI	NIC	-
25391	Press, hydraulic, electric, 100 ton	OF / OI	NIC	-
26401	Refrigerant reclamation, portable (CoolTech A/C charging cart)	OF / OI	NIC	-
27081	Saw, cutoff, bench mounted	OF / OI	NIC	-
27091	Saw, cutoff wheel, 14", with stand (Makita, Model 2414NB)	OF / OI	NIC	-
27201	Saw, table	OF / OI	NIC	-
28361	Vise, 8", bench mounted	OF / OI	NIC	-
29001	Welder, MIG, portable, w/ wire feed (Snap On, Model MM250SL)	OF / OI	NIC	-
29101	Welder, arc, portable (Miller, Model Dialarc 250-AC/DC)	OF / OI	NIC	-
29251	Welder, plasma cutter, portable (Thermal Dynamics, Model: Cutmaster 38)	OF / OI	NIC	-
29301	Welder, oxyacetylene, portable (Cutting torch)	OF / OI	NIC	-



Mark	Description	Meth	Section	Submittals
33421	Sand Blaster, bench mounted	OF / OI	NIC	-
33421	Sand Blaster, bench mounted	OF / OI	NIC	-
35601	Tank, parts cleaning (parts washer)	OF / OI	NIC	-
49101	Wheel Balancer (SNAP-ON, Model WB410)	OF / OI	NIC	-
50301	Cart, tool storage	OF / OI	NIC	-
50302	Cart, tool storage	OF / OI	NIC	-
50303	Cart, tool storage	OF / OI	NIC	-
50304	Cart, tool storage	OF / OI	NIC	-
50305	Bin, wheel, weight (tire parts storage)	OF / OI	NIC	-
50306	Cart, diesel caddy with pump on top	OF / OI	NIC	-
50307	Cart, oil, with drain funnel	OF / OI	NIC	-
50308	Facing Tool Cart	OF / OI	NIC	-
53451	Forklift, 6,000 lbs, propane (Toyota)	OF / OI	NIC	-
57941	Lift, column, 4 set (Mohawk, Model MP-18)	OF / OI	NIC	-
62451	Brake, sheet metal	OF / OI	NIC	-
63301	Crimper, hydraulic hose, cart mounted	OF / OI	NIC	-
81651	Drain pan	OF / OI	NIC	-
81652	Drain pan	OF / OI	NIC	-
84901	Press, filter, floor mounted (Bedford, Model P-200L serial # 24999)	OF / OI	NIC	-
89401A	Tank, storage, 275 gallon (Oil Container 15W-40, Ace Tank)	OF / OI	NIC	-
89401B	Tank, storage, 220 gallon (76 Super ATF Container - Ace Tank)	OF / OI	NIC	-
89401C	Tank, storage, 330 gallon (Diesel Exhaust Fluid tote - Terra Cair, Model DEF ISO 22241)	OF / OI	NIC	-
89401D	Tank, storage, 250 gallon (Used oil container)	OF / OI	NIC	-
89401E	Tank, storage, 210 gal (New antifreeze)	OF / OI	NIC	-
89402E	Tank, storage, 200 gal (Used antifreeze)	OF / OI	NIC	-
99101	Generator, diesel (Kholer Power Sys, Model 50ROZJ-PA-189335)	OF / OI	NIC	-
99301	Workstation, computer, cart mounted	OF / OI	NIC	-
99302	Workstation, computer, cart mounted	OF / OI	NIC	-
99501	Nitrogen generator (IR, Model N21600-P6)	OF / OI	NIC	-
99801	Drum, 55 gal, used oil, filter crusher	OF / OI	NIC	-
99802	Tank, 30 gal, used brake fluid	OF / OI	NIC	-
99991	Mezzanine, parts	OF / OI	NIC	-

### PART 3 - EXECUTION

Not Used

END OF SECTION 11 06 11

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1 SECTION 113100 - APPLIANCES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Exhaust Hood Shell

- 9 B. Related Sections:

- 10 1. Division 12 Section “Manufactured Wood Casework” for coordination of appliances built  
11 into or sitting between cabinets.  
12 2. Division 22 Sections for kitchen sinks, waste disposers, and instant hot-water dispensers.  
13 3. Division 23 Sections for cooking system ventilation requirements.

14 1.3 ACTION SUBMITTALS

- 15 A. Product Data: For each type of product indicated. Include rated capacities, operating  
16 characteristics, dimensions, furnished accessories, and finishes for each appliance.

- 17 B. Product Schedule: For appliances. Use same designations indicated on Drawings.

18 1.4 INFORMATIONAL SUBMITTALS

- 19 A. Qualification Data: For qualified manufacturer.

- 20 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
21 America requirements.

- 22 C. Product Certificates: For each type of appliance, from manufacturer.

- 23 D. Warranties: Sample of special warranties.

24 1.5 CLOSEOUT SUBMITTALS

- 25 A. Operation and Maintenance Data: For each appliance to include in operation and maintenance  
26 manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintains, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- B. Source Limitations: Obtain appliances from single manufacturer, except where differing manufacturers are specified herein.
- C. Regulatory Requirements: Comply with the following:
  - 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. ANSI: Provide gas-burning appliances that comply with ANSI Z21 Series standards.
- D. Accessibility: Unless noted otherwise, appliances shall comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117, plus any locally adopted regulations or code requirements.
  - 1. Operable Parts: Provide controls with forward reach no higher than 48 inches (1219 mm) above the floor, horizontal reach no more than 25 inches (635 mm), horizontal side reach no more than 24 inches (610 mm), and that do not required tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2N).
  - 2. Refrigerator/Freezer: Provide 50 percent of freezer space within 54 inches (1370 mm) of the floor.

1.7 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace appliances or components that fail in materials or workmanship within specified warranty period except as qualified below:
  - 1. Warranty Period: Except as noted above, appliance warranties shall be one year from the date of Substantial Completion.
- B. Refrigerators and Freezers Sealed System: Limited warranty including parts and labor for first year and parts thereafter for on-site service on the product.
  - 1. Warranty Period for Sealed Refrigeration System: Two years from date of Substantial Completion.
  - 2. Warranty Period for Other Components: Two years from date of Substantial Completion.
- C. Range: Limited warranty including parts and labor for first year and parts thereafter for on-site service on the product.
  - 1. Warranty Period for Commercial Range System: Two years from date of Substantial Completion.

D. Dishwasher: Limited warranty including parts and labor for first year and parts thereafter for on-site service on the product.

1. Warranty Period for Deterioration of Tub and Metal Door Liner: Five years from date of Substantial Completion.
2. Warranty Period for Other Components: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 KITCHEN EXHAUST VENTILATION

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

B. Overhead Exhaust Hood Shell:

1. Basis-of-Design Product: Air King Ventilation Products, RS Series; 30" wide.
2. Type: Wall or top-mounted, exhaust-hood shell.
3. Material: Stainless Steel, 24 Gauge.
4. Finish: Stainless Steel
5. Additional Information: See mechanical and electrical drawings for lighting and mechanical connections.

### 2.2 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of appliances.

B. Examine roughing-in for piping and electrical systems to verify actual locations of piping and electrical connections before appliance installation.

C. Examine walls, ceilings, and roofs for suitable conditions where appliances will be installed.

D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

A. General: Comply with manufacturer's written instructions.

B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.

C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

D. Range Anti-Tip Device: Install at each range according to manufacturer's written instructions.

E. Utilities: See Divisions 22 and 26 for plumbing and electrical requirements.

### 3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.

2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.

3. Operational Test: After installation, start units to confirm proper operation.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.

C. An appliance will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

### 3.4 DEMONSTRATION

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

END OF SECTION 113100

1 SECTION 122113 - HORIZONTAL LOUVER BLINDS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. Section Includes:

- 8 1. Horizontal louver blinds with aluminum slats.

- 9 B. Related Requirements:

- 10 1. Division 05 Section "Cold-Formed Metal Framing" and Division 9 Section "Non-  
11 Structural Metal Framing" for metal blocking for mounting horizontal louver blinds and  
12 accessories.  
13 2. Division 08 Sections for coordination of horizontal louver blinds to be installed on  
14 hollow metal and aluminum framed systems. Confirm that the installation of horizontal  
15 louver blinds on these systems are not in conflict with these systems manufacturer's  
16 requirements, and do not interfere with their function.

17 1.3 ACTION SUBMITTALS

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

- 19 B. Shop Drawings: Show fabrication and installation details for horizontal louver blinds.

- 20 1. Motorized Operators: Include details of installation in headrails and diagrams for power,  
21 signal, and control wiring.

- 22 C. Samples: For each exposed product and for each color and texture specified, 12 inches (300  
23 mm) long.

- 24 D. Window-Treatment Schedule: For horizontal louver blinds. Use same designations indicated  
25 on Drawings.

26 1.4 INFORMATIONAL SUBMITTALS

- 27 A. Product Certificates: For each type of horizontal louver blind.

- 28 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
29 America requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Horizontal Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and gloss indicated, but no fewer than two units.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.



PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Levolor Contract; Mark I DustGuard or comparable product by one of the following:

1. Hunter Douglas Contract.
2. Levolor Contract; a Newell Rubbermaid company.
3. Springs Window Fashions.
4. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

- B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.

1. Width: 1 inch (25 mm).
2. Thickness: Not less than 0.008 inch (0.20 mm).
3. Spacing: Manufacturer's standard.
4. Finish: As indicated by the Basis-of-Design product.

- C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.

1. Capacity: One blind per headrail unless otherwise indicated.
2. Ends: Capped or plugged.
3. Manual Lift Mechanism:

- a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within blind full operating range. Provide cord length as required to make operation convenient from floor level, but not higher than four feet above the finished floor, or lower as required to meet handicapped accessibility codes, unless indicated otherwise on the drawings.
- b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.

4. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.

- a. Tilt: Full.
- b. Operator: Clear-plastic wand.
- c. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.

5. Manual Lift-Operator and Tilt-Operator Lengths: Provide length as required to make operation convenient from floor level, but not higher than four feet above the finished floor, or lower as required to meet handicapped accessibility codes, unless indicated otherwise on the drawings.
6. Manual Lift-Operator and Tilt-Operator Locations: Right side and left side of headrail, respectively, unless otherwise indicated.
- D. Bottom Rail: Formed-steel or extruded-aluminum tube that secures and protects ends of ladders and lift cords and has plastic- or metal-capped ends.
  1. Type: Manufacturer's standard.
- E. Lift Cords: Manufacturer's standard braided cord.
- F. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.
  1. Type: Braided cord.
- G. Valance: PVC strip.
- H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
  1. Type: As required by mounting position indicated on drawings.
  2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.
- I. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.
- J. Colors, Textures, Patterns, and Gloss:
  1. Slats: See Color Schedule on Drawings. The Architect reserves the right to change color(s) and select from manufacturer's full range at no additional cost.
  2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

## 2.3 HORIZONTAL LOUVER BLIND FABRICATION

- A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
  1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch (6 mm) per side or 1/2 inch (13 mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).

2. Outside of Jamb Installation: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

- C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.

- D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.

- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

- F. Color-Coated Finish:

1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.

1. Locate so exterior slat edges are not closer than 1 inch (25 mm) from interior faces of glass and not closer than 1/2 inch (13 mm) from interior faces of glazing frames through full operating ranges of blinds, unless indicated otherwise on the Drawings.
2. Install mounting and intermediate brackets to prevent deflection of headrails.
3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

1 3.3 ADJUSTING

- 2 A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating  
3 ranges.

4 3.4 CLEANING AND PROTECTION

- 5 A. Clean horizontal louver blind surfaces after installation according to manufacturer's written  
6 instructions.

- 7 B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and  
8 Installer and that ensure that horizontal louver blinds are without damage or deterioration at  
9 time of Substantial Completion.

- 10 C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by  
11 Architect before time of Substantial Completion.

12 END OF SECTION 122113

1 SECTION 122413 - ROLLER WINDOW SHADES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

7 A. Section Includes:

- 8 1. Motor-operated roller shades.

9 B. Related Requirements:

- 10 1. Division 05 Section "Cold-Formed Metal Framing" and Division 09 Section "Non  
11 Structural Metal Framing" for metal blocking and backing for mounting roller shades and  
12 accessories.  
13 2. Division 07 Section "Joint Sealants" for sealing the perimeters of installation accessories  
14 for light-blocking shades with a sealant.  
15 3. Division 26 Sections for electrical service and connections for motors, controls, limit  
16 switches, and other powered devices and for system disconnect switches for motor-  
17 operated shades.

18 1.3 ACTION SUBMITTALS

19 A. Product Data: For each type of product.

- 20 1. Include styles, material descriptions, construction details, dimensions of individual  
21 components and profiles, features, finishes, and operating instructions for roller shades.

22 B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband  
23 materials, their orientation to rollers, and their seam and batten locations.

- 24 1. Motor-Operated Shades: Include details of installation and diagrams for power, signal,  
25 and control wiring.

26 C. Samples: For each exposed product and for each color and texture specified, 10 inches (250  
27 mm) long.

28 D. Samples for Initial Selection: For each type and color of shadeband material.

- 29 1. Include Samples of accessories involving color selection.

30

E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 10 inches (250 mm) square. Mark inside face of material if applicable.

#### 1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

#### 1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roller shades to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

#### 1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

#### 1.9 WARRANTY

A. Brackets: 10 year warranty from date of Substantial Completion.

B. Fabric: 25 year warranty from date of Substantial Completion in which manufacturer agrees to replace fabric that has deteriorated, compromising performance of shade to provide room darkening, or other noticeable deterioration.

PART 2 - PRODUCTS

2.1 MANUAL ROLLER SHADES

A. Basis-of-Design Product: Subject to compliance with requirements, provide MechoShade Systems, Inc.; 4133 Pocket Mount Urban Shade or comparable product by one of the following:

1. Lutron Electronics Co., Inc.
2. Solarfective Products, Ltd.
3. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

B. Source Limitations: Obtain roller shades from single source from single manufacturer.

C. Product:

1. Fabric: Mechoshade Thermoveil Dense Basket Weave, 2-3% open.
2. Color: As selected by Architect from Manufacturer's full range of available colors.
3. Mounting: Face mounted, unless detailed otherwise.
4. Mounting: On window framing, unless detailed otherwise.
5. Direction of Roll: Regular roll.

a. Shade Pulls: Bead chain/clutch; polyester or steel construction, color as selected by Architect.

6. Hardware:

a. Materials:

1. Brackets/End Caps: End mount, with optional fascia and headbox.
2. Fascia: Extruded, with matching end caps, fascia screwed to brackets.

b. Finish: Color as selected by the Architect from the full range of available colors.

2.2 ROLLER-SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
  1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.
- B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.



- 1 C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect,  
2 before time of Substantial Completion.

3 3.5 DEMONSTRATION

- 4 A. Engage a factory-authorized service representative to train Owner's maintenance personnel to  
5 adjust, operate, and maintain motor-operated roller shades.

6 END OF SECTION 122413



SECTION 123200 - MANUFACTURED WOOD CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Casework Scope: Casework of this section provides for all casework for this project, unless specifically noted otherwise in other sections.
2. Casework Types: Furnish and install, custom and standard, complete in place except as hereinafter set forth, factory-fabricated, assembled and finished plastic-laminate faced, wood veneer faced and custom wood fixed casework (cabinets), mobile casework, book shelves, utility shelving, and other special items described herein, all as shown on the Drawings.
3. Plastic Laminate Countertops and Backsplashes and Other Related Items: This Section includes all plastic laminate faced countertops and back splashes, plastic laminate wainscots, and other similar plastic laminate applications, unless specifically noted for inclusion under another Section. Countertops shall be assumed to be provided at all base cabinets under 72 inches above finished floor, whether shown or called out or not. Unless noted otherwise, these tops shall be assumed to have a plastic laminate finish. Where called out, or where graphically depicted (even if not called out), provide a back splash and end return back splashes, finished the same as the countertop. Unless noted otherwise, back splashes shall be 4 inches high, and shall be adhered to a ¾ inch thick backing material, as specified herein. Unless noted otherwise, countertops shall be provide for restroom and other sink locations shown without base cabinets, whether called out or not, except where wall hung lavatories are used. These countertops shall be provided with painted steel support brackets as required to properly support the counter and to provide handicapped accessible knee space.
4. Other Countertops and Backsplashes: This section also includes countertops and backsplashes in addition to plastic laminate, such as but not limited to stainless steel and solid-surfacing, as specified herein.
5. Referenced Standards: Casework items shall meet or exceed the standard of construction and material quality set forth in the references AWI standards, and shall also meet or exceed Westmark's commercial casework specifications, except where specific construction and material requirements are specified under Article 2.00 of this Section or in "Notes to Casework Schedule and Details" or on the drawings which modify said standard published specifications. Casework shall meet or exceed the specific construction and material requirements specified.
6. Casework Modifications: Manufacturers shall alter their casework as necessary to suit building dimensions, and to suit equipment to be installed adjacent thereto.

B. Related Sections:

1. Division 05 and 09 Sections "Cold-Formed Metal Framing" and "Non-Structural Metal Framing" for metal backing, blocking and reinforcements for anchoring manufactured wood casework.
2. Division 05 "Metal Fabrications" for requirements for steel components associated with custom casework specified herein. Provide steel components required for custom casework under this section. Comply with material and fabrication requirements of Division 05 "Metal Fabrications".
3. Division 05 "Metal Fabrications" for requirements for steel components associated with custom casework specified herein.
4. Division 06 "Interior Finish Carpentry" for wood trim and wainscot requirements.
5. Division 08 Section "Door Hardware" for lock cylinders to be furnished for installation under this Section.
6. Division 08 Section "Glazing" for back-painted glass back splashes.
7. Division 09 Section "Resilient Base and Accessories" for resilient base applied to manufactured wood casework.
8. Division 09 Section "Painting" for field finishing of installed interior architectural woodwork.
9. Division 22 through 27 Sections for Rough-in for furnishing and installation of, and connections to, mechanical and electrical fixtures and fittings to be built into casework covered under Mechanical and Electrical Work Contracts, as applicable, respectively

1.3 DEFINITIONS

A. MDF: Medium-density fiberboard.

B. Exposed Portions of Cabinets:

1. Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches (1220 mm) above floor, and surfaces visible in open cabinets.
2. Interiors of open cabinets.
3. Cabinet tops under 72" above finish floor, or over 72" above finish floor if visible from an upper building level.
4. Visible edges of cabinet ends, doors and drawer fronts.
5. Visible surfaces behind glass doors.
6. Sloping tops of cabinets that are visible.

C. Semi-exposed Portions of Cabinets:

1. Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches (1980 mm) or more above floor are defined as semi-exposed.
2. All surfaces visible when doors and drawers are open including interior faces of hinged doors.
3. The underside bottoms of wall hung cabinets, where bottom is below 4 feet above finished floor.
4. Visible portions of bottoms, tops and ends in front of sliding doors in closed position.

D. Concealed Portions of Cabinets:

1. Surfaces not usually visible after installation, including sleepers, stretchers, web frames, dust panels, and ends and backs that are placed directly against walls or other cabinets.
2. Toe space unless otherwise specified.
3. Security panels.
4. Underside of bottoms of cabinets less than 30 inches above the finished floor.
5. Flat tops of cabinets over 78 inches above the finished floor, except if visible from an upper building level.
6. The three non-visible edges of adjustable shelves.
7. The underside of countertops, knee spaces (except visible side panels or cabinets), and drawer aprons.
8. The faces of cabinet ends of adjoining units that butt together.

E. Hardwood Plywood: A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive, and faced both front and back with hardwood veneers.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, including as aspect of casework and hardware.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show fabrication details, including types and locations of hardware. Show installation details, including field joints and filler panels. Indicate manufacturer's catalog numbers for casework.

1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.
2. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
3. Show location(s) of each item, dimensioned plans and elevations, large scale details, attachment devices and other components. Locate sink centerlines for guidance of other trades.

C. Substitution Requests: In addition to the requirements of Division 1 Section "Substitutions", the following shall establish the minimum submittal requirements for substitution requests:

1. Sample base cabinet with construction matching the project specifications and casework notes. Include door, drawer, adjustable shelf, countertop, and hardware.
2. Full manufacturer's product literature and product specifications.
3. Listing of at least 5 previous projects with similar casework, and of the same project type, including project name, date, contract value, address, owner's phone number and contact name, architect's name and phone number, and general contractor's name and phone number.
4. Letter certifying the manufacturer's ability to meet the project specifications, requirements, and schedule.

D. Samples for Initial Selection: For cabinet finishes and for each type of top material indicated.

1. Shop-applied transparent finishes.
2. Shop-applied opaque finishes.
3. Plastic laminates.
4. Thermoset decorative overlays.
5. Solid surfacing materials.
6. Edging materials.
7. Hardware finishes.
8. In addition to samples for standard finish components, provide samples of powder coating for both quality and colors. Repeat sample submittal process until color and finish are acceptable to the Architect.

E. Samples for Verification: 8-by-10-inch (200-by-250-mm) Samples for each type of finish, including top material and the following:

1. Section of countertop showing top, front edge, and backsplash construction.
2. Full sized base cabinet, 24 inches wide, with cabinet drawer, door, adjustable shelf, hardware, and countertop, illustrating compliance with these specifications.

F. Keying Schedule

1. Product certificates signed by woodwork fabricator certifying that products comply with specified requirements.
2. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Fabricator/Manufacturer and Installer.

B. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

C. Warranty: Sample of special warranty.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish complete touchup kit for each type and finish of manufactured wood casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged casework finish.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
2. Firm experienced in producing architectural casework similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work. Firm shall have successfully completed a minimum of 10 projects of similar size, type, and schedule in the last two years, and provide evidence, satisfactory to the Architect, of such.

B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

C. Source Limitations: Obtain manufactured wood casework from single source from single manufacturer.

D. Single-Source Responsibility for Fabrication and Installation: Engage a qualified casework manufacturer to assume undivided responsibility for fabricating, finishing, and installing casework specified in this Section.

E. Quality Standard: Unless otherwise indicated, comply with requirements for modular cabinets in AWI's "Architectural Woodwork Quality Standards."

1. Provide AWI Quality Certification Program certificate indicating that manufactured wood casework complies with requirements.
2. The Contract Documents contain selections chosen from options in the Quality Standard as well as additional requirements beyond those of the Quality Standard. Comply with such selections and requirements in addition to the Quality Standard.

F. Reference Standard: All Materials shall conform to these requirements:

1. Decorative, High Pressure Plastic Laminates: NEMA LD-3 (National Electrical Manufacturers Association).
  - a. Horizontal Grade .050" = GP50.
  - b. Postforming grade .042" = PF42.
  - c. Vertical Grade .028 = VG28.
  - d. Cabinet Linear Grade .020 = CL20. Low Pressure Thermofused Polyester and Melamine Laminates: ALA (American Laminators Association).
3. PVC Edgebanding: (polyvinyl chloride) on seamless rolls to be applied with automatic edge banding machines using hot-melt adhesives. Product to be chip proof, flame and moisture resistant.
4. Particleboard: ANSI 208.1 (American National Standards Institute).
5. Softwood Plywood: U.S. Product Standards PS1.
6. Hardwood Plywood: ANSI HPVA (Hardwood Plywood & Veneer Association).
7. Hardboard: ANSI AHA 135.484 (American Hardboard Association).
8. PVA Adhesive: (polyvinyl acetate) White glue, Type III ASTM D3110 (American Society for Testing and Materials).

9. Aliphatic Adhesive: (carpenters glue) Type II ASTM D3110 (American Society For Testing and Materials).
10. Solvent Based Contact Cement MMM-A-J1330B.
11. Workmanship: Comply with industry standards AWI (Architectural Woodwork Institute) and WIC (Woodwork Institute of California).

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

H. Casework Mock-Ups: Provide casework mock-ups as follows. Mock-ups may become a part of the finished installation if approved by the Architect.

1. Custom Cabinet with Wood Stripping: Provide at least one full-sized section of casework with wood stripping facing. Show complete and final finished cabinet including all finishes, hardware and accessories.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver manufactured wood casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.

B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

#### 1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install manufactured wood casework until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of construction contiguous with manufactured wood casework by field measurements before fabrication.

C. Environmental Limitations: Obtain and comply with casework fabricator's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install casework until these conditions have been attained and stabilized so that woodwork will be within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.

#### 1.10 COORDINATION

A. Coordinate layout and installation of framing and reinforcements in walls and partitions for support of manufactured wood casework.



- B. Hardware Coordination: Distribute copies of approved schedule for cabinet hardware specified in Division 08 Section "Door Hardware" to fabricator of architectural casework; coordinate cabinet shop drawings and fabrication with hardware requirements.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's warrants that all casework materials and workmanship conform to project specifications and industry standards, and in which Manufacturer agrees to repair or replace, at no cost to the Owner, components of manufactured wood casework that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Delamination of components or other failures of glue bond.
- b. Warping of components.
- c. Failure of operating hardware.
- d. Deterioration of finishes.

2. Warranty Period: One year from date of Substantial Completion.

3. Variations from Referenced Standards: The warranty shall covered all products specified herein, even if they vary from the referenced standards, including but not limited to plastic laminate faced plywood core doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Casework: The following architectural casework manufacturers are approved, subject to conformance with the Contract Documents, provided that overall dimensions shown are adhered to and no filler (unless specifically shown otherwise), in excess of 1 1/2 inches are permitted:

1. Manufactured Casework:

- a. Genothern Cabinet Manufacturing Inc., Tumwater, WA (360) 352-3636
- b. Westmark Commercial Casework, Tacoma, WA (253) 531-3470
- c. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

- B. Core Material: All core material listed herein shall be "Boise Evergreen™" by Boise Cascade, or "Skyblend" by Roseberg Forest Products, Roseberg, Oregon, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.

2.2 MATERIALS, GENERAL

- A. Low-Emitting Materials: Fabricate manufactured wood casework, including countertops, with adhesives and composite wood products containing no urea formaldehyde.

- B. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.

- 1 C. Hardwood Plywood: HPVA HP-1, either veneer core or particleboard core unless otherwise  
2 indicated.
- 3 D. Softwood Plywood: DOC PS 1.
- 4 E. MDO Softwood Plywood: DOC PS 1.
- 5 F. MDF: ANSI A208.2, Grade 130.
  - 6 1. Recycled Content: Not less than 75 percent recycled content.
- 7 G. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3, as selected  
8 by Architect from full range of colors, (including “premium” products) patterns, available  
9 textures from Formica, Wilsonart, Nevamar, and Abaca. Architect reserves the right to select  
10 from more than one manufacturer. Provide full range of samples from all three for selection.  
11 For bidding purposes, assume ten (10) different colors for the project. Also see Color Schedule  
12 on the drawings. The Architect reserves the right to change any scheduled color and/or pattern  
13 at no additional charge.
  - 14 1. Static Dissipative Laminate
    - 15 a. Nevamar Static Dissipative laminate sheets.
- 16 H. Edgebanding for Plastic Laminate: As is standard for the basis-of-design product specified  
17 herein.
- 18 I. Edgebanding for Wood-Veneered Construction: Minimum 1/8-inch- (3-mm-) thick, solid wood  
19 of same species as face veneer, unless detailed otherwise.
  - 20 1. Select wood edgebanding for grain and color compatible with face veneers.
- 21 J. Stainless-Steel Sheet: ASTM A 240 or ASTM A 666, Type 304, with No. 4 satin finish.
- 22 K. Plate Steel: Provide plate steel as detailed, associated with custom casework. Provide in  
23 accordance with the requirements of Division 5 Section “Metal Fabrications”. Fully weld all  
24 joints, and grind all welds smooth. Powder coat steel in accordance with the requirements of  
25 Division 9 Section “Interior Painting”. Provide all necessary attachment hardware as detailed  
26 and as required by the design.
- 27 L. Solid-Surfacing Material: Quartz.
  - 28 1. Basis of Design: Pental Quartz
  - 29 2. Manufacturers: Subject to compliance with requirements, provide Basis of Design  
30 products, or comparable products by one of the following:
    - 31 a. ABA Industries.
    - 32 b. Avonite Surfaces; Aristech Acrylics LLC.
    - 33 c. E. I. du Pont de Nemours and Company.
    - 34 d. Formica Corporation.
    - 35 e. LG Solid Source, L.L.C.
    - 36 f. Meganite Inc.; a division of The Pyrochem Group.

- g. Nevamar Company, LLC; Decorative Products Div.
- h. Samsung; Cheil Industries Inc.
- i. Swan Corporation (The).
- j. Transolid, Inc.
- k. Wilsonart International; Div. of Premark International, Inc.
- l. Dupont, Zodiac
- m. Or approved substitute during the bid process per the Instructions to Bidders and Section 012500.

3. Thickness: 3cm.

## 2.3 CABINET MATERIALS

### A. Exposed Cabinet Materials:

1. Wood Species: Birch trim where birch is noted or where hardwood is noted. Clear, vertical grain fir where fir is indicated.
2. Plywood: Birch hardwood veneer plywood with face veneer of species indicated, selected for compatible color and grain. Grade A exposed faces at least 1/50 inch (0.5 mm) thick, and Grade J crossbands. Provide backs of same species as faces.
3. Plastic Laminate: Grade HGS.
4. Unless otherwise indicated, provide specified edgebanding on all exposed edges.

### B. Semi-exposed Cabinet Materials:

1. Solid Wood: Sound lumber, selected to eliminate appearance defects, of same species as exposed wood.
2. Plywood: Hardwood plywood of same species as exposed wood. Grade B faces and Grade J crossbands. Provide backs of same species as faces.
3. Plastic Laminate: Grade VGS.
  - a. Provide plastic laminate for semi-exposed surfaces unless otherwise indicated.
  - b. Provide plastic laminate for interior faces of doors and drawer fronts and where indicated.
4. Unless otherwise indicated, provide specified edgebanding on all semi-exposed edges.

### C. Concealed Cabinet Materials:

1. Solid Wood: Any species, with no defects affecting strength or utility.
2. Plywood: Hardwood plywood, with backs of same species as faces.
3. Plastic Laminate: Grade BKL.

## 2.4 DESIGN, COLOR, AND FINISH

- ### A. General Casework:
- Reveal overlay style with PVC edge banding as specified herein, as selected by Architect from the manufacturer's full range of available colors. Basis-of-Design shall be Westmark "400" series or equivalent from an approved manufacturer, modified and customized in accordance with these Drawings and Specifications.

- 1 B. Custom Casework: Hardwood veneer plywood, hardwood trim, and softwood trim, of custom  
2 design as indicated on Drawings. Provide species as indicated herein.
- 3 C. Wood Colors and Finishes: See Division 09 Section "Staining and Transparent Finishing" for  
4 finishing requirements of trim and hardwood veneer plywood. Provide under this section  
5 meeting the requirements as specified therein. See Color Schedule on drawings. The Architect  
6 reserves the right to change the schedule color without additional charge.
- 7 D. MDO Plywood Painting: See Division 09 Section "Interior Painting" for finishing requirements  
8 of MDO plywood. See Color Schedule on drawings.
- 9 E. Plastic-Laminate Colors, Patterns, and Finishes: See the Color Schedule on the drawings. The  
10 Architect reserves the right to change any or all colors, and to select from the plastic laminate  
11 manufacturers full range of available colors, patterns and finishes, including premium products,  
12 at no additional charge. The selected colors/patterns and manufacturers listed on the Color  
13 Schedule shall be bid, and shall not be changed to a alternative manufacturer without the  
14 Architects written permission. The Architect shall not be bound to an alternative manufacturer  
15 as a result of the bid process.
- 16 F. Low Pressure Thermofused Melamine or Polyester Laminate (if specified) Colors, Patterns, and  
17 Finishes: As selected by Architect from manufacturer's full range of available colors.
- 18 G. PVC Edgebanding Color: As selected from casework manufacturer's full range.
- 19 H. Solid-Surfacing Material Colors and Patterns: See the Color Schedule on the drawings. The  
20 Architect reserves the right to change any or all colors, and to select from the manufacturers full  
21 range of available colors and patterns, at no additional charge. The selected colors/patterns and  
22 manufacturers listed on the Color Schedule shall be bid, and shall not be changed to a  
23 alternative manufacturer without the Architects written permission. The Architect shall not be  
24 bound to an alternative manufacturer as a result of the bid process.

25 2.5 CABINET FABRICATION, GENERAL

- 26 A. Complete fabrication, including assembly, finishing, and hardware application, before shipment  
27 to Project site to maximum extent possible. Disassemble components only as necessary for  
28 shipment and installation. Where necessary for fitting at site, provide ample allowance for  
29 scribing, trimming, and fitting.
- 30 B. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing  
31 fixtures, electrical work, and similar items. Locate openings accurately and use templates or  
32 roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of  
33 cutouts and, where located in countertops and similar exposures, seal edges with a water-  
34 resistant coating.
- 35 C. Install glass to comply with applicable requirements of Division 8 Section "Glazing" and of  
36 FGMA "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.6 CABINET FABRICATION

A. Wood-Faced Cabinet Construction: As required by referenced quality standards, but not less than the following:

1. Bottoms of Cabinets and Tops of Wall Cabinets: 3/4-inch (19-mm) hardwood veneer-core plywood.
2. Ends of Cabinets: 3/4-inch (19-mm) hardwood veneer-core plywood.
3. Shelves: 3/4-inch (19-mm) hardwood veneer-core plywood.
4. Base Cabinet Top Frames: 3/4-by-2-inch (19-by-51-mm) solid wood with mortise and tenon or doweled connections, glued and pinned or screwed.
5. Base Cabinet Stretchers: 3/4-by-4-1/2-inch (19-by-114-mm) hardwood veneer-core plywood, particleboard, or MDF strips or solid-wood boards at front and back of cabinet, glued and pinned or screwed
6. Base Cabinet Subtops: 3/4-inch (19-mm) panel product glued and pinned or screwed.
7. Backs of Cabinets: 3/4-inch (19-mm) hardwood veneer-core plywood, dadoed into sides, bottoms, and tops where not exposed. Removable backs shall be provided where indicated on drawings, and where required to access concealed plumbing or wiring if required by code or other specification sections.
8. Drawer Fronts: 3/4-inch (19-mm) hardwood veneer-core plywood or solid wood. Inside color to match cabinet interiors. Door fronts shall be attached to the sub-fronts with minimum of four #8 x 1-inch panhead screws. Edges shall be banded with material noted in paragraph 2.2 noted above.
9. Drawer Sides and Backs: 1/2-inch (12.7-mm) solid-wood or hardwood veneer-core plywood, with glued dovetail or multiple-dowel joints. Drawer parts shall be joined together with 6 mm x 25 mm hardwood dowels 32 mm on centers.
10. Drawer Bottoms: 1/4-inch (6.4-mm) hardwood veneer-core plywood glued and dadoed into front, back, and sides of drawers. Bottoms shall be tongues into sides, back and sub-front, glued and clamped to produce a rigid square drawer. Use 1/2-inch (12.7-mm) material for drawers more than 24 inches (600 mm) wide.
11. Doors 48 Inches (1220 mm) or Less in Height: 3/4 inch (19 mm) thick, with solid hardwood stiles and rails, MDF cores, and hardwood face veneers and crossbands.
12. Doors More Than 48 Inches (1220 mm) in Height: 1-1/8 inches (29 mm) thick, with particleboard cores and wood face veneers and crossbands.

B. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:

1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch (19-mm) particleboard, unless indicated otherwise on Drawings or Specifications plastic-laminate faced.
2. Shelves: Plywood core, as follows.
  - a. Band all edges with 0.018-inch thick PVC edgebanding to match cabinet face.
  - b. Adjustable shelves shall be supported on 4 shelf clips in cabinets up to 25-inches deep and 6 shelf clips in cabinets greater than 25-inches deep.
  - c. Fixed and adjustable shelves shall be type and thickness as specified hereinabove, overlaid with high pressure laminate on both sides. Edges shall be banded with specified PVC edgebanding.
  - d. Shelf Thickness:

- 1) 30 inches wide or less:  $\frac{3}{4}$  inch.
  - 2) 31 to 40 inches wide: 1 inch.
  - 3) 41 to 48 inches wide: 1-1/8 inch.
3. Backs of Cabinets: 1/2-inch (12.7-mm) particleboard, plastic-laminate faced.
  4. Drawer Fronts: 3/4-inch (19-mm) particleboard, plastic-laminate faced.
  5. Drawer Sides and Backs: 1/2-inch (12.7-mm) thermoset decorative panels, with glued dovetail or multiple-dowel joints.
  6. Drawer Bottoms: Same as sides and backs.
  7. Doors: 3/4-inch (19-mm) MDF plastic-laminate faced.
- C. Leg Shoes: Vinyl or rubber, black, open-bottom type.
- D. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.
- 2.7 FINISH FOR WOOD-FACED MANUFACTURED CASEWORK
- A. Preparation: Sand lumber and plywood for manufactured wood casework construction before assembling. Sand edges of doors and drawer fronts and molded shapes with profile-edge sander. Sand casework after assembling for uniform smoothness at least equivalent to that produced by 220-grit sanding and without machine marks, cross sanding, or other surface blemishes.
  - B. Staining: Remove fibers and dust and apply wash-coat sealer and stain to exposed and semi-exposed surfaces as required to provide uniform color and to match approved samples.
  - C. Finishing Closed-Grain Woods: Apply manufacturer's standard two-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and a thermosetting catalyzed conversion varnish. Sand and wipe clean between applications of sealer and topcoat. Topcoat may be omitted on concealed surfaces.
  - D. Finishing Open-Grain Woods: Apply manufacturer's standard three-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and two coats of a thermosetting catalyzed conversion varnish. Sand and wipe clean between applications of sealer and topcoat and between topcoats. Topcoats may be omitted on concealed surfaces.
- 2.8 CASEWORK HARDWARE AND ACCESSORIES
- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware, as required for proper casework construction and operation. Include fastenings and accessories as required.
    1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
  - B. Butt Hinges: Stainless-steel, concealed, medium duty hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 hinges for doors less than 48 inches (1220 mm) high and 3 hinges for doors more than 48 inches (1220 mm) high.

- C. Standard Pulls: Solid stainless-steel wire pulls, fastened from back with two screws. For sliding doors, provide recessed stainless-steel flush pulls. Provide 2 pulls for drawers more than 24 inches (600 mm) wide. Provide for all locations, except for locations specifically noted for special pulls.
- D. Special Pulls: Berenson Metro, Uptown Appeal in brushed nickel, 5” long. Provide for casework at Building A.
- E. Door Catches: Zinc-plated, dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches (1220 mm) high.
- F. Drawer Slides: BHMA A156.9, Type B05091.
1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides. Full extension slides. Provide positive in and out stops, stay close detent, and steel ball bearings.
  2. Box Drawer Slides: Grade 1HD-100, for drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide. Full extension slides. Provide positive in and out stops, stay close detent, and steel ball bearings.
  3. File Drawer Slides: Grade 1HD-200, for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide. Full extension slides. Provide positive in and out stops, stay close detent, and steel ball bearings.
  4. Pencil Drawer Slides: Grade 1, for drawers not more than 3 inches (75 mm) high and 24 inches (600 mm) wide. Full extension slides. Provide positive in and out stops, stay close detent, and steel ball bearings.
  5. Keyboard Slides: Grade 1HD-100, for computer keyboard shelves.
  6. Trash Bin Slides: Grade 1HD-200, for trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide. Full extension slides. Provide positive in and out stops, stay close detent, and steel ball bearings.
- G. Label Holders: Stainless steel, sized to receive standard label cards approximately 1 by 2 inches (25 by 51 mm), attached with screws or brads.
1. Provide label holders where indicated.
- H. Drawer and Hinged Door Locks: Mortise type, 5-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
1. Lock cylinders to be furnished by Division 08 Section “Door Hardware” and installed under this section. Locks to be dead bolt type, constructed with solid brass cylinder and five pin tumblers. Exposed finish to be US26D satin chrome. Keying shall be alike per room, different between rooms and master keyed. Provide 10 master keys and 5 keys per room. Olympus model 720 Series lock.
  2. Provide a minimum of two keys per lock and six master keys.
  3. Provide locks where indicated.
- I. Adjustable Shelf Supports: Mortise-type, zinc-plated steel standards and shelf rests complying with BHMA A156.9, Type B04071 and B04091.

J. Support Brackets:

1. Unless detailed otherwise, countertop support brackets shall be constructed of 16 gauge 1 1/2" tube steel, with welded construction. Brackets to be powder coated to match cabinet interiors.
  - a. 18" x 21" legs for up to 26" deep countertop.
  - b. 21" x 27" legs for up to 32" deep countertop.

- K. Grommets for Cable Passage through Countertops: 2-inch (51-mm) OD, white (unless indicated otherwise on Color Schedule on drawings), molded-plastic grommets and matching plastic caps with slot for wire passage.

2.9 OTHER MATERIALS

A. Cork Facing:

1. Manufacturer: Forbo, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
2. Product: "Forbo Cork," 1/4-inch thick.
3. Colors: See Color Schedule on Drawings.
4. Location: Tack Board wainscot at Building A.

B. Support Brackets:

1. Unless detail otherwise, countertop support brackets shall be constructed of 15 gauge 1 1/2" tube steel, with welded construction. Brackets to be powder coated to match cabinet interiors. 18" x 21" legs for up to 26" deep countertops. 21" x 27" legs for up to 32" deep countertops.
2. Single shelf support brackets shall be constructed of 1 1/4" flat bar with 1/4" wire rod gusset. Brackets shall all be welded construction designed to support up to a 15" deep wall shelf. Brackets to be powder coated to match cabinet interiors.

2.10 COUNTERTOPS

- A. Countertops, General: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Provide front and end overhang of 1 inch (25 mm) over base cabinets.

- B. Plastic-Laminate Tops: Plastic-laminate sheet, shop bonded to both sides of 3/4-inch (19-mm) plywood or MDF. Sand surfaces to which plastic laminate is to be bonded.

1. Plastic Laminate for Formed Tops: Grade HGP.
2. Plastic Laminate for Backing: Grade BKL.
3. Construct top and backsplash from one piece of plastic laminate with rolled edges and coved intersection. Where indicated, provide separate end splashes fitted to top.
4. Use exterior plywood or exterior glue MDF for countertops containing sinks.



C. Solid-Surfacing-Material Tops: 3cm thick, as indicated on the drawings, solid-surfacing material with front edge built up with same material.

1. Front: Straight, eased edge at all exposed faces, unless detailed otherwise on the drawings.
2. Backsplashes: 3/4-inch- (19-mm-) thick, solid-surfacing material; radiused edge with 3/8-inch (9.5-mm) radius, unless detailed otherwise on the drawings.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, substrates, location of framing and reinforcements, temperature, humidity, and other conditions affecting performance of manufactured wood casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 CASEWORK INSTALLATION

##### A. Attachment, General:

1. All casework items shall be securely anchored to building walls and floors, except for those items identified as “mobile” or “moveable” on drawings, which are to be adjusted to prevent any rocking when sitting on finish floor.
2. Primary anchorage of base and wall cabinets shall be through the 1/2” thick cabinet back into wall framing or blocking furnished under other sections. Additional anchorage will be made into cabinet bases and adjacent side walls where they occur. Appropriate sized anchor screws shall be used to best attach to the existing wall condition which will allow each cabinet to be loaded to a capacity of 50 lb. per sq. ft. of shelf area.
3. Installations shall be in strict conformance with seismic codes.
4. At free-spanning countertops or work surfaces, steel support bracket shall be provided at a maximum spacing of 32 inches, or as shown on drawings. Support brackets are to be designed to allow for knee space clearance and attach to wall framing for support. Powder coat to match adjacent wall color.

- B. Install level, plumb, and true; shim as required, using concealed shims. Where manufactured wood casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch (1.5 mm) of a single plane. Fasten cabinets to masonry or framing, wood blocking, or reinforcements in walls and partitions with fasteners spaced 24 inches (600 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch (1.5 mm).

1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 16 inches (400 mm) o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.

D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch (1.5 mm) of a single plane. Fasten to hanging strips, masonry, or framing, blocking, or reinforcements in walls or partitions. Align similar adjoining doors to a tolerance of 1/16 inch (1.5 mm).

1. Fasten through back, near top and bottom, at ends, and not more than 16 inches (400 mm) o.c.
2. Use toggle bolts at hollow masonry.
3. Use expansion anchors at solid masonry.
4. Use No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish at metal-framed partitions.

E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

F. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

G. Plastic Laminate Wainscots: Adhere to wall at locations shown with backing and adhesive as recommended by the manufacturer. Install with aluminum edge and joint trim.

### 3.3 INSTALLATION OF TOPS AND WINDOW SILLS

A. Field Jointing: Where possible make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

B. Secure tops to cabinets with Z- or L-type fasteners or equivalent, using two or more fasteners at each front, end, and back.

C. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.

D. Secure backsplashes and end splashes to tops with concealed metal brackets at 16 inches (400 mm) o.c. and walls with adhesive.

E. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

1    3.4        CLEANING AND PROTECTING

2        A.        Repair or remove and replace defective work as directed on completion of installation.

3        B.        Clean finished surfaces with low VOC liquid cleaner as recommended by manufacturer, touch  
4                    up as required, and remove or refinish damaged or soiled areas to match original factory finish,  
5                    as approved by Architect.

6        C.        Protection: Provide 6-mil (0.15-mm) plastic or other suitable water-resistant covering over  
7                    countertop surfaces. Tape to underside of countertop at a minimum of 48 inches (1220 mm)  
8                    o.c. Remove protection at Substantial Completion.

9    END OF SECTION 123200

10



1 SECTION 124813 - ENTRANCE FLOOR MATS AND FRAMES

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General Conditions and Division 01  
5 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. This Section includes the following:

- 8 1. Entrance mats in recessed frames.

- 9 B. Related Sections include the following:

- 10 1. Division 03 Section "Cast-in-Place Concrete" for slab for recessed mats and frames.

11 1.3 ACTION SUBMITTALS

- 12 A. Product Data: Include construction details, material descriptions, dimensions of individual  
13 components and profiles, and finishes.

- 14 B. Buy America: Certification that all steel components are provided in compliance with the Buy  
15 America requirements.

- 16 C. Shop Drawings.

- 17 D. Samples for Verification: For each type of product indicated.

- 18 1. Floor Mat: 12-inch- (300-mm-) square, assembled sections of floor mat.  
19 2. Tread Rail: 12-inch- (300-mm-) long Sample of each type and color.  
20 3. Frame Members: 12-inch- (300-mm-) long Sample of each type and color.

21 1.4 CLOSEOUT SUBMITTALS

- 22 A. Maintenance Data: For floor mats and frames to include in maintenance manuals.

23 1.5 QUALITY ASSURANCE

- 24 A. Source Limitations: Obtain floor mats and frames through one source from a single  
25 manufacturer.

- B. Accessibility Requirements: Provide installed floor mats that comply with Section 4.5 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)", Sections 302 and 303 in ICC A117.1, and the requirements of the agency having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.

1.7 COORDINATION

- A. Coordinate size and location of recesses in concrete with installation of finish floors to receive floor mats and frames.

PART 2 - PRODUCTS

2.1 ENTRANCE MATS & FRAMES: TYPE 1

- A. Basis-of-Design Product: Subject to compliance with requirements, provide C/S Group; PediTred G4, or approved substitute during the bid process per the Instructions to Bidders and Specification Section 012500.
- B. Mats: 1-1/8 inch thick, manufactured from type 304 stainless steel. Wire to be 0.086 inch x 0.117 inch electronically welded and spaced 0.118 inches apart. Capable of withstanding 500 pounds of wheel loads.
- C. Tapered Angle Frames: 6063-TS Aluminum angle frame, 3/4 inch deep recess with black anodized finish.
- D. Tread Inserts: C/S Group MonoTuft HD™ Carpet. Color per Color Schedule on Drawings.

2.2 CONCRETE FILL AND GROUT MATERIALS

- A. Provide concrete grout and fill equivalent in strength to cast-in-place concrete slabs for recessed mats and frames. Use aggregate no larger than one-third fill thickness.

2.3 FABRICATION

- A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.

B. Recessed Frames: As indicated, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.

1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

C. Coat surfaces of aluminum frames that will contact cementitious material with manufacturer's standard protective coating.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

A. Examine substrates and floor conditions for compliance with requirements for location, sizes, minimum recess depth, and other conditions affecting installation of floor mats and frames.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

A. Install recessed mat frames to comply with manufacturer's written instructions. Set mat tops at height recommended by manufacturer for most effective cleaning action; coordinate top of mat surfaces with bottom of doors that swing across mats to provide clearance between door and mat.

1. Install necessary shims, spacers, and anchorages for proper location and secure attachment of frames.
2. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

#### 3.3 PROTECTION

A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION 124813





SECTION 129300 – SITE FURNISHINGS (ADDITIVE ALTERNATE #5)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes installation of miscellaneous benches and site furnishings.
- B. Related Sections:
  - 1. Division 3 Section “Cast-In-Place Concrete” and Section “Architectural Concrete” for sidewalks, plinths, footings, etc.

1.3 REFERENCES

- A. See Related Sections for reference standards.

1.4 SUBMITTALS

- A. Refer to Division 013300 for submittal procedures.
- B. Samples: Submit samples of all materials and finishes.
- C. Shop Drawings: Submit installation details for site furnishings.

1.5 SUBSTITUTIONS

- A. Substitutions will be considered during the bid process per Specification Section 012500.

PART 2 - PRODUCTS

2.1 BENCHES

- A. Landscape Forms “Austin”, aluminum slats with back.
- B. Quantity: as shown on plans
- C. Colors: “Panguard II” finish; standard color – Silver.
- D. Installation: Surface Mounted
- E. Product Representative: Tim Gish, (800) 430-6206 x 1319, [timg@landscapeforms.com](mailto:timg@landscapeforms.com).

2.2 TRASH AND RECYCLING RECEPTACLES

- A. “Dispatch Litter and Recycling Receptacle”, Model: SLDIS-220-1Q, or equivalent.
- B. Quantity: as shown on plans
- C. Painting: Standard colors; Slate Textured for top, Aluminum Textured for Body.
- D. Installation: Surface Mounted
- E. Product Representative: Mike Benz, Forms + Surfaces, (425) 213-3490.

2.3 BIKE RACK

- A. Landscape Forms “Pi”, cast aluminum,
- B. Quantity: as shown on plans.
- C. Colors: “Panguard II” finish; standard color – Silver.
- D. Installation: Surface Mounted.
- E. Product Representative: Tim Gish, (800) 430-6206 x 1319, [timg@landscapeforms.com](mailto:timg@landscapeforms.com).

2.4 BOLLARDS

- A. Landscape Forms “Stop”, cast aluminum and steel, , Silver loop, Black post.
- B. Colors: “Panguard II” finish; standard colors: Cover casting – Silver, Interior Pipe – Black.
- C. Quantity: as shown on plans.
- D. Installation: Surface Mounted.
- E. Product Representative: Tim Gish, (800) 430-6206 x 1319, [timg@landscapeforms.com](mailto:timg@landscapeforms.com).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform forming, cutting, drilling, welding, and fitting required for installing elements. Set elements accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

3.2 ADJUSTING AND CLEANING

- A. Replace constructed and installed elements that are damaged or do not comply with requirements. Adjust for uniform appearance.

3.3 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.

END OF SECTION 329400

1 SECTION 133419 - METAL BUILDING SYSTEMS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

- 4 A. Drawings and general provisions of the Contract, including General and Supplementary  
5 Conditions and Division 01 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. This Section includes metal building systems that consist of all primary, secondary, tertiary and  
8 structural framing components, roof insulation system, metal roofing, rigid foam plastic wall  
9 insulation, and all related accessories necessary for a complete building structural system fully  
10 integrated with all other building envelope components specified elsewhere, plus all associated  
11 engineering. This Section applies to the following structures:

12 1. Building A: Main Building

13 2. Building B: Fuel Canopy

14 B. Related Sections:

- 15 1. Division 5 Section "Cold-Formed Metal Framing" metal wall stud framing installed at  
16 metal buildings.
- 17 2. Division 5 Section "Metal Fabrications" for down spouts.
- 18 3. Division 7 Section "Sheet Metal Flashing and Trim" for sheet metal flashing and trim  
19 associated with metal wall panels.
- 20 4. Division 7 Section "Wall Panels" for factory-formed metal wall panels and related  
21 accessories installed at metal buildings over steel girt framing and secondary framing.
- 22 5. Division 7 Section "Joint Sealants" for coordination of required sealants for metal  
23 building systems.
- 24 6. Division 7 Section "Thermal Insulation" for thermal insulation installed in exterior metal  
25 walls at metal building.
- 26 7. Division 7 Section "Weather Barriers" for coordination of all openings in building  
27 envelope for complete weather tight installation.
- 28 8. Division 08 Section "Overhead Sectional Doors."
- 29 9. Division 8 Section "Louvers and Vents" for metal louvers installed in Metal Building  
30 Systems.
- 31 10. Division 8 Section "Sunshades" for aluminum sunshades attached to steel supports  
32 provided by metal building manufacturers.

11. Division 9 Section “High Performance Coatings” for coordination of metal building system priming specified under this Section and finish coats specified under that section.
12. Division 10 Section "Fire Protection Specialties" for fire extinguishers and cabinets installed in metal building.
13. All other sections of this Project Manual for related work not specifically covered under this section but required for complete metal buildings.

### 1.3 DEFINITIONS

- A. Bay: Dimension between main frames measured normal to frame (at centerline of frame) for interior bays, and dimension from centerline of first interior main frame measured normal to end wall (outside face of end-wall girt) for end bays.
- B. Building Length: Dimension of the building measured perpendicular to main framing from end wall to end wall (outside face of girt to outside face of girt).
- C. Building Width: Dimension of the building measured parallel to main framing from sidewall to sidewall (outside face of girt to outside face of girt).
- D. Clear Span: Distance between supports of beams, girders, or trusses (measured from lowest level of connecting area of a column and a rafter frame or knee).
- E. Eave Height: Vertical dimension from finished floor to eave (the line along the sidewall formed by intersection of the planes of the roof and wall).
- F. Clear Height under Structure: Vertical dimension from finished floor to lowest point of any part of primary or secondary structure, not including crane supports, located within clear span.
- G. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in referenced standards.

### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of metal building system component. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
  1. Structural-steel-framing system.
  2. Metal roof panels.
  3. Roof insulation system and vapor retarder facings
  4. Rigid wall insulation panels
  5. Flashing and trim.
  6. Accessories.

- 1 B. Shop Drawings: For the following metal building system components, for each separate  
2 building structure. Include plans, elevations, sections, details, loads, lateral/vertical design  
3 calculations and attachments to other work. Show provisions for photovoltaic panels that will  
4 be installed in the future, not under this contract. Shop drawings and calculations shall be  
5 signed and sealed by a licensed professional engineer in the State of Washington responsible for  
6 their preparation.
- 7 1. Anchor-Bolt Plans: Submit anchor-bolt plans before foundation work begins and a  
8 minimum of 14 days before start of foundation reinforcing shop drawing work. Include  
9 location, diameter, and projection of anchor bolts required to attach metal building to  
10 foundation. Indicate column reactions at each location (vertical, uplift and lateral loads).  
11 Coordinate all column locations and details with foundation assumptions noted on structural  
12 drawings.
- 13 2. Structural-Framing Drawings: Show complete fabrication of primary and secondary  
14 framing; include provisions for openings. Indicate welds and bolted connections,  
15 distinguishing between shop and field applications. Include transverse cross-sections.
- 16 a. Show provisions for attaching items or equipment mounted to the roof or walls.  
17 b. Show loads, details, and all attachments associated with equipment and cranes  
18 supported from roof structure. GC to coordinate between all trades.  
19 c. Show all steel, girts, and connections associated with bracing of exterior masonry  
20 and metal stud wall transitions. All girts and lateral main frame deflections shall  
21 be designed to limit deflections at L/600 when laterally supporting masonry.
- 22 3. Metal Roof Panel Layout Drawings: Show layouts of metal panels including methods of  
23 support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim,  
24 flashings, closures, and special details. Distinguish between factory- and field-assembled  
25 work; show locations of exposed fasteners.
- 26 a. Show roof-mounted items including fall restraint components, penetrations,  
27 lighting fixtures, and other items mounted on roof.
- 28 4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2  
29 inches per 12 inches (1:8):
- 30 a. Flashing and trim.  
31 b. Gutters.  
32 c. Downspout locations.
- 33 C. Buy America: Certification that all steel components are provided in compliance with the Buy  
34 America requirements.
- 35 D. Samples for Initial Selection: For units with factory-applied color finish.
- 36 E. Samples for Verification: For each type of exposed finish required, prepared on Samples of  
37 sizes indicated below:
- 38 1. Metal Panels: Nominal 12 inches (300 mm) long by actual panel width. Include fasteners,  
39 closures, and other exposed panel accessories.

2. Flashing and Trim: Nominal 12 inches (300 mm) long. Include fasteners and other exposed accessories.
3. Rigid wall board insulation: Nominal 12-inch- (300-mm-) square Samples.
4. Vapor-Retarder Facings: Nominal 6-inch- (150-mm-) square Samples.
5. Accessories: Nominal 12-inch- (300-mm-) long Samples for each type of accessory.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified erector, manufacturer, and professional engineer.
- B. Welding certificates.
- C. Metal Building System Certificates: For each type of metal building system, from manufacturer.
- D. Letter of Design Certification: Signed and sealed by licensed professional engineer in the State of Washington responsible for their preparation.

1. Include the following for each individual building structure:

- a. Name and location of Project.
- b. Order number.
- c. Name of manufacturer.
- d. Name of Contractor.
- e. Building dimensions including width, length, height, and roof slope.
- f. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
- g. Governing building code and year of edition.
- h. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
- i. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
- j. Building-Use Category: Indicate category of building use and its effect on load importance factors.
- k. AISC Certification, IAS Accredited: Include statement that metal building system and components were designed and produced in an AISC-Certified Facility by an AISC-Certified Manufacturer.

E. Erector Certificates: For each product, from manufacturer.

F. Manufacturer Certificates: For each product, from manufacturer.

G. Material Test Reports: For each of the following products:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.

- 1           3. Tension-control, high-strength, bolt-nut-washer assemblies.
- 2           4. Shop primers.
- 3           5. Non-shrink grout.
- 4       H.    Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer
- 5           and witnessed by a qualified testing agency, for insulation and vapor-retarder facings. Include
- 6           reports for thermal resistance, fire-test-response characteristics, water-vapor transmission, and
- 7           water absorption.
- 8       I.    Warranties: Sample of special warranties.
- 9   1.6       CLOSEOUT SUBMITTALS
- 10       A.    Maintenance Data: For metal panel finishes to include in maintenance manuals.
- 11   1.7       QUALITY ASSURANCE
- 12       A.    Manufacturer Qualifications: A qualified manufacturer and member of MBMA.
- 13           1.    AISC Certification AIS Accredited: An AISC-Certified Manufacturer that designs and
- 14           produces metal building systems and components in an AISC-Certified Facility.
- 15       B.    Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering
- 16           analysis by a licensed professional engineer in the State of Washington responsible for their
- 17           preparation.
- 18       C.    Erector Qualifications: An experienced erector who specializes in erecting and installing work
- 19           similar in material, design, and extent to that indicated for this Project and who is acceptable to
- 20           manufacturer. Erector shall have completed a minimum of 10 projects with similar systems and
- 21           of similar size.
- 22       D.    Source Limitations: Obtain metal building system components, including primary and
- 23           secondary framing and metal panel assemblies, from single source from single manufacturer.
- 24       E.    Welding Qualifications: Qualify procedures and personnel according to the following:
- 25           1.    AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- 26           2.    AWS D1.3, "Structural Welding Code - Sheet Steel."
- 27       F.    Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings," for
- 28           design requirements and allowable stresses.
- 29       G.    Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of
- 30           Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

- 1 H. Surface-Burning Characteristics: Provide vapor-retarder-facing materials with the following  
2 surface-burning characteristics as determined by testing identical products per ASTM E 84 by  
3 UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
- 4 1. Flame-Spread Index: 25 or less, unless otherwise indicated.  
5 2. Smoke-Developed Index: 50 or less, unless otherwise indicated.
- 6 I. Preinstallation Conference: Conduct conference at Project site.
- 7 1. Review methods and procedures related to metal building systems including, but not limited  
8 to, the following:
- 9 a. Condition of foundations and other preparatory work performed by other trades.  
10 b. Structural foundation load confirmation procedures.  
11 c. Construction schedule. Verify availability of materials and erector's personnel,  
12 equipment, and facilities needed to make progress and avoid delays.  
13 d. Required tests, inspections, and certifications.  
14 e. Unfavorable weather and forecasted weather conditions.
- 15 2. Review methods and procedures related to metal roof panel assemblies including, but not  
16 limited to, the following:
- 17 a. Compliance with requirements for purlin and rafter conditions, including flatness  
18 and attachment to structural members.  
19 b. Structural limitations of purlins and rafters during and after roofing.  
20 c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs,  
21 and condition of other construction that will affect metal roof panels.  
22 d. Temporary protection requirements for metal roof panel assembly during and after  
23 installation.  
24 e. Roof observation and repair after metal roof panel installation.
- 25 3. Review methods and procedures related to metal wall panel assemblies including, but not  
26 limited to, the following:
- 27 a. Compliance with requirements for support conditions, including alignment  
28 between and attachment to structural members.  
29 b. Structural limitations of girts and columns during and after wall panel installation.  
30 c. Flashings, special siding details, wall penetrations, openings, and condition of  
31 other construction that will affect metal wall panels.  
32 d. Temporary protection requirements for metal wall panel assembly during and after  
33 installation.  
34 e. Wall observation and repair after metal wall panel installation.
- 35 4. Review methods and procedures related to priming and finish painting of all primary  
36 structural components.



1.8 DELIVERY, STORAGE, AND HANDLING

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

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements:
  - 1. Established Dimensions for Foundations: Comply with established dimensions on approved anchor-bolt plans, establishing foundation dimensions and proceeding with fabricating structural framing without field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.
  - 2. Established Dimensions for Metal Panels: Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and proceed with fabricating metal panels without field measurements, or allow for field trimming metal panels. Coordinate construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

1.10 COORDINATION

- A. Coordinate sizes and locations of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- B. Coordinate installation of equipment supports and roof penetrations, which are specified in Division 07 Section "Roof Accessories."
- C. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.
- D. Coordinate application of primers and finish coatings to ensure quality application is achieved under suitable conditions.
- E. Coordinate all work necessary to secure required permits for the metal building system.

1.11 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Verify available warranties and warranty periods for units and components with manufacturers listed in Part 2. 20-year period is common for fluoropolymer finish; 25- and 30-year periods are available from some manufacturers. 10-year period is usually available for siliconized polyester.

3. Finish Warranty Period: 20 years from date of Substantial Completion.

B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels:

1. Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.

2. Verify available warranties and warranty periods for units and components with manufacturers listed in Part 2.

3. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Basis of Design product by Varco Pruden Buildings - a division of BlueScope Buildings North America, Inc. or comparable product by one of the following:

1. Manufacturers in list below are a sampling of those offering a complete line of metal building systems and components, not an exhaustive list. Insert other manufacturers whose systems are also acceptable.

2. American Buildings Company; Division of Magnatrx Corp.

3. Behlen Mfg. Co.

4. Butler Manufacturing Company; a BlueScope Steel company.

5. Garco Building Systems; Division of NCI Building Systems, L.P.

6. Metallic Building Company; Division of NCI Building Systems, L.P.

7. Star Building Systems; an NCI company.

8. Or approved substitute during the bid process per Specification Sections 002100 and 012500.

## 2.2 METAL BUILDING SYSTEMS

- A. Description: Provide a complete, integrated set of metal building system manufacturer's standard and custom, mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.

1. Provide metal building system of size and with bay spacings, roof slopes, foundation support locations, and spans indicated.

- B. Primary-Frame Type:

1. Rigid Clear Span: Solid-member, structural-framing system without interior columns (unless specifically shown in the Contract Drawings) where indicated with or without portal frames located per architectural and structural drawings.
2. Rigid Modular: Solid-member, structural-framing system with interior columns where indicated and with portal frames located per structural drawings.

- C. End-Wall Framing: Manufacturer's standard consisting of primary frame, capable of supporting a full bay design load, and end-wall columns.

- D. Secondary-Frame Type: Manufacturer's standard purlins and girts.

- E. Eave Height: As indicated by nominal height on Drawings.

- F. Bay Spacing: As indicated by nominal height on Drawings.

- G. Roof Slope: As indicated by nominal height on Drawings.

- H. Roof System: Manufacturer's standard vertical-rib, standing-seam metal roof panels with field-installed insulation.

## 2.3 METAL BUILDING SYSTEM PERFORMANCE

- A. Delegated Design: Design metal building system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

- B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."

1. Base Roof Dead- and Live-Loads: As indicated on Structural Drawings. See Equipment Drawings for additional loads. General Contractor to coordinate between all trades.

2. Deflection Limits: Design metal building system assemblies to withstand design loads with deflections no greater than the following:

- a. Purlins and Rafters: Vertical deflection of  $L/240$  of the span.
- b. Girts: Horizontal deflection of  $L/240$  of the span ( $L/600$  where supporting masonry)
- c. Metal Roof Panels: Vertical deflection of  $L/240$  of the span.
- d. Metal Wall Panels: Horizontal deflection of  $L/240$  of the span.
- e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.

3. Drift Limits: Engineer building structure to withstand design loads with drift limits no greater than the following:

- a. Lateral Drift: Maximum of  $H/200$  of the building height.

4. Metal panel assemblies shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated according to ASTM E 1592.

C. Seismic Performance: Metal building systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and as required by the Structural Drawings.

D. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

- 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. Air Infiltration for Metal Roof Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of roof area when tested according to ASTM E 1680 at negative test-pressure difference of 1.57 lbf/sq. ft. (75 Pa).

F. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 at test-pressure difference of 2.86 lbf/sq. ft. (137 Pa).

G. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

## 2.4 STRUCTURAL-STEEL FRAMING

A. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; masonry bracing, crane support structure, and wind bracing.

- 1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated on architectural and structural drawings.

2. Rigid Modular Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
  - a. Exterior Column Type: Tapered
  - b. Rafter Type: Tapered
  - c. Portal Type: Non-tapered.
  - d. Interior Columns: Non-tapered
- B. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:
  1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet.
  2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
- C. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:
  1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch- (64-mm-) wide flanges.
    - a. Depth: As indicated.
  2. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
  3. Flange Bracing: Minimum 2-by-2-by-1/8-inch (51-by-51-by-3-mm) structural-steel angles or 1-inch- ((25-mm-)) diameter, cold-formed structural tubing to stiffen primary-frame flanges.
  4. Sag Bracing: Minimum 1-by-1-by-1/8-inch (25-by-25-by-3-mm) structural-steel angles.
  5. Base or Sill Angles: Minimum 3-by-2-inch (76-by-51-mm) zinc-coated (galvanized) steel sheet.
  6. Purlin Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
  7. Secondary End-Wall Framing: Manufacturer's standard sections fabricated structural-steel sheet.
  8. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
  9. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

D. Bracing: Provide adjustable wind bracing as follows:

1. Retain one of first six subparagraphs below, or retain more than one and seventh subparagraph if type of bracing is manufacturer's option.
2. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 (345); or ASTM A 529/A 529M, Grade 50 (345); minimum 1/2-inch- (13-mm-) diameter steel; threaded full length or threaded a minimum of 6 inches (152 mm) at each end.
3. Cable: ASTM A 475, 1/4-inch- (6-mm-) diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.
4. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
5. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
6. Fixed-Base Columns: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
7. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.
8. Bracing: Provide wind bracing using any method specified above, at manufacturer's option.

E. Bolts: Provide plain-finish bolts for structural-framing components that are primed or finish painted. Provide hot-dip galvanized bolts for structural-framing components that are galvanized.

F. Materials:

1. W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
3. Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
4. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
5. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
6. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55 (205 through 380), or High-Strength Low-Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480); or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80 (170 through 550), or High-Strength Low-Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480).
7. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550), or High-Strength Low-Alloy Steel (HSLAS), Grades 50 through 80 (340 through 550); with G60 (Z180) coating designation; mill phosphatized.

- 1 8. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568M,  
2 Property Class 4.6), carbon-steel, hex-head bolts; ASTM A 563 (ASTM A 563M) carbon-  
3 steel hex nuts; and ASTM F 844 plain (flat) steel washers.
  - 4 a. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C
- 5 9. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-  
6 hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy-hex carbon-steel nuts; and  
7 ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
  - 8 a. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C
- 9 10. High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy-  
10 hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy-hex carbon-steel nuts; and  
11 ASTM F 436 (ASTM F 436M) hardened carbon-steel washers, plain.
- 12 11. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1,  
13 heavy-hex-head steel structural bolts with spline ends.
  - 14 a. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50
- 15 12. Unheaded Anchor Rods: ASTM F 1554, Grade 36 and as indicated on structural drawings.
  - 16 a. Configuration: Straight.
  - 17 b. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
  - 18 c. Plate Washers: ASTM A 36/A 36M carbon steel.
  - 19 d. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
  - 20 e. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C
- 21 13. Headed Anchor Rods: ASTM F 1554, Grade 36 and as indicated on structural drawings.
  - 22 a. Configuration: Straight.
  - 23 b. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
  - 24 c. Plate Washers: ASTM A 36/A 36M carbon steel.
  - 25 d. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
  - 26 e. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C
- 27 14. Recycled Content of Steel Products (Voluntary Goal): Postconsumer recycled content plus  
28 one-half of preconsumer recycled: 25 percent.
- 29 G. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
  - 30 1. Primer by Metal Building Manufacturer (in their shop): Shop prime with manufacturer's  
31 standard red oxide primer. SSPC-Paint 15, Type I, red oxide. For certain elements, as  
32 described below, this primer is for shipping purposes only.
  - 33 2. Primer in Local Shop: Ship metal building components, specified herein to be primed and  
34 painted, to a local shop for stripping, preparation and priming. All non-galvanized, ferrous  
35 metal components, generally including but not limited to "Primary Framing Components",  
36 "Canopy Framing", "End-Wall Framing", and "Bracing" are to be locally stripped,  
37 prepared, and primed in a local shop using the primer specified in Division 9 Section "High  
38 Performance Coatings", or approved substitute during the bid process per Specification  
39 Sections 002100 and 012500.

3. Apply primer to primary framing to a minimum dry film thickness of 1 mil (0.025 mm).

- a. Prime secondary framing formed from G-30 galvanized steel sheet with a paintable acrylic protective coating.

## 2.5 METAL ROOF PANELS

- A. Vertical-Rib, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.

1. Basis of Design Product: VP Buildings; SLR Roof, or approved equivalent from an approved manufacturer.

2. Material: Aluminum-zinc alloy-coated steel sheet, 22 gauge nominal thickness.

- a. Exterior Finish: Fluoropolymer.
- b. Color: See Color Schedule on the drawings. The Architect reserves the right to change colors and select from the manufacturer's full range of available colors.

3. Clips: Manufacturer's standard, floating type to accommodate thermal movement; fabricated from aluminum-zinc alloy-coated steel or stainless steel sheet.

4. Joint Type: Mechanically seamed, double folded.

5. Panel Coverage: 16 inches (406 mm).

6. Panel Height: 2 inches (51 mm).

7. Uplift Rating: UL 90.

- B. Materials:

1. Metallic-Coated Steel Sheet: Restricted-flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

- a. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
- b. Surface: Smooth, flat finish.

- C. Finishes:

1. Exposed Coil-Coated Finish:

- a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.



- 1) Primer: minimum dry film thickness: 0.2 – 0.25 mils.
  - 2) Top Coat: minimum dry film thickness: 0.8 – 1.7 mils.
2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

2.6 METAL WALL PANELS

- A. Provided under Division 7 Section “Metal Wall Panels”.

2.7 THERMAL INSULATION SYSTEMS

- A. Manufacturers:

1. CertainTeed Corporation.
2. Guardian Fiberglass, Inc.
3. Johns Manville.
4. Knauf Fiber Glass.
5. Owens Corning.
6. Pacific Insulation Products
7. Thermal Design
8. Or approved substitute during the bid process per Specification Sections 02100 and 012500.

- B. Rigid Polyurethane Wall Insulation Panels:

1. Specifically designed for metal building systems
2. Location: High bay metal building area where indicated on Drawings as "Air/Vapor Barrier Insulation panel".
3. R-Value / Thickness: 2.5 inch thickness: R-19 minimum. (7.3 R per inch)
4. Flame Spread: <25
5. Smoke Developed: <450
6. Fire Testing: UL 1715 or UL 1040, NFPA 286 (Tested to IBC Section 2603.10 standards)
7. Air Barrier Performance:
  - a. Component: Less than 0.004 CFM
  - b. Assembly: Less than 0.04 CFM
  - c. Building: Less than 0.4 CFM
8. Compressive Strength: 31 psi
9. Density: 2.2 - 2.5 lb/sq ft
10. Exposure rated foam: Yes

11. Finished seams: Yes

C. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing);

1. Maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

2. R-Value – Roof Assembly:

a. Upper layer over purlins: 3.5 inch, Minimum R-11

b. Between purlins, 8 inch, Minimum R-25.

## 2.8 INSULATION RETAINAGE SYSTEM AND FASTENERS

A. General: Provide insulation fasteners as specified herein, and as required to fully and properly complete the insulation installation specified, and illustrated on the drawings whether specified herein or not. Install in compliance with the manufacturer's recommendations.

B. Metal Building System Insulation Energy Saver Support Fabric and Strapping:

1. Manufacturers:

a. Thermal Design "Energycraft Insulation System"

b. Therm-all Insulation, "Optiliner System"

c. Simple Saver System

d. Or approved substitute during the bid process per Specification Sections 02100 and 012500.

2. Vapor Retarder Fabric: Provide support fabric over bottom side of roof purlins providing finished appearance.

a. Color: White

b. Fabric: Woven, reinforced high density polyethylene yarns coated on both sides with a continuous white polyethylene film.

c. Fire Retardance: Flame spread index of 25 or less smoke density index of 50 or less, based on ASTM E-84.

d. Fabrication: Material shall be manufactured in large custom pieces by extrusion welding from roll goods. Pieces shall be fabricated to substantially fit the large defined building areas with minimum practical sealing to be done on the job site. Fabric shall be folded to allow for rapid pull out on the strap support system.

e. Perm Rating: .02 grains/hr/sf/in based on ASTM E 96 Procedure A, desiccant method.

3. Steel Strap: 80 KSI tempered, high tensile-strength steel, galvanized, primed and factory-painted white. Provide minimum size.

4. Fasteners: #12 x 3/4 plated Tek 2 screws, for up to 1/4" thick, painted white.

5. Provide manufacturer's standard thermal block at top of purlins.

2.9 FOAM PLASTIC INSULATION

- A. General: Provide all accessories and fasteners as required or recommended by the foam plastic insulation manufacturer for a complete installation as specified herein, and as illustrated on the drawings whether specified herein or not.
- B. Coordinate all trades as required for complete exterior envelope installation.

2.10 DOORS AND FRAMES

- A. See Division 8 Sections.

2.11 WINDOWS

- A. See Division 8 Sections.

2.12 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
  - 1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
  - 1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
  - 2. Clips: Manufacturer's standard, formed from stainless-steel sheet, designed to withstand negative-load requirements.
  - 3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet or nylon-coated aluminum sheet.
  - 4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  - 5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inch (25-mm) standoff; fabricated from extruded polystyrene.

C. Flashing and Trim: Formed from aluminum-zinc alloy-coated steel sheet prepainted with coil coating of same gauge of material as the metal roofing; finished to match adjacent metal panels. Provide under this section, but comply with the requirements of Division 7 Section "Sheet Metal Flashing and Trim". Provide flashing and trim under this section as noted in subparagraphs C.1 and C.2.

1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.- Roof-Related Flashing and Trim: Provide, under this section, all eaves, rakes, corners, roof openings, fasciae, ridges, and other miscellaneous flashing for a complete, weathertight installation from the eaves to the ridge of all metal buildings.

2. Opening Trim: Formed from aluminum-zinc alloy-coated steel sheet prepainted with coil coating of same gauge of material as the metal roofing. Trim head and jamb of door openings, and head, jamb, and sill of other openings. All Other Flashing, Trim, Soffits: Provide all other flashing, trim, and soffit panels, not otherwise included under roof-related flashing and trim, in compliance with Division 7, Section "Sheet Metal Flashing and Trim."

D. Gutters: Formed from 22 gauge nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- (2438-mm-) long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."

1. Gutter Supports: Fabricated from same material and finish as gutters.

2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

E. Down Spouts: As specified in Division 5 Section "Metal Fabrications".

F. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

G. Snow Guards: Prefabricated, noncorrosive units designed to be installed without penetrating metal roof panels, and complete with predrilled holes, clamps, or hooks for anchoring.

1. Seam-Mounted, Bar-Type Snow Guards stainless-steel rods or bars held in place by stainless-steel clamps attached to vertical ribs of standing-seam metal roof panels.

a. Stainless-Steel Finish: Mill.

b. Products:

1) LMCurbs; S-5 SnoRail. Note; "SnoClip" is not required.

2) Or approved substitute during the bid process per specification Sections 002100 and 012500.

2. Design and Engineering: The design intent is to provide Snow Guards at selected locations where required to protect snow from falling on people exiting the building. Locations are

shown on the Roof Plan. The drawings do not show the quantity of snow guards for these locations. The manufacturer shall determine the required quantity and lengths, and provide within the bid. It shall be the bidders' responsibility to work with the Snow Guard manufacturer to fully design and engineer the Snow Guards, include all such costs in the bid, and to prepare fully detailed shop drawings and engineering calculations for the Architect's review. The Architect shall have the right to adjust Snow Guard placement on the roof for aesthetic reasons, provided it does not add to the overall quantity or impact the engineering requirements.

H. Bird Control Devices:

1. Provide "Nixalite" (1-800-624-1189) Bird-Netting or equivalent product.

a. Material: 6-ply high density polyethylene (HDPE)

b. Size: ¾ inch x ¾ inch square mesh

c. Color: Black

d. Location: Building B, as indicated on Drawings.

I. Materials:

1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of factory-applied coating.

a. Fasteners for Metal Roof Panels: Self-drilling zinc plated carbon steel screws with type 300 stainless steel caps with integral EPDM washers.

b. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

2. Metal Panel Sealants:

a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.

b. Joint Sealant: ASTM C 920; one-part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.13 SOURCE QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to evaluate product.

B. Special Inspector: Owner may engage a qualified special inspector to perform the following tests and inspections and to submit reports. Special inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.

1. Special inspections will not be required if fabrication is performed by manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.

a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

C. Testing: Test and inspect shop connections for metal buildings according to the following:

1. RCSC prescribes inspection for snug-tightened joints and testing and inspection for each method of pretensioning joints.

2. Bolted Connections: Shop-bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

3. Welded Connections: In addition to visual inspection, shop-welded connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:

a. Liquid Penetrant Inspection: ASTM E 165.

b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

c. Ultrasonic Inspection: ASTM E 164.

d. Radiographic Inspection: ASTM E 94.

D. Product will be considered defective if it does not pass tests and inspections.

## 2.14 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.

1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.

2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

1. Make shop connections by welding or by using high-strength bolts.

2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.

3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.

4. Weld clips to frames for attaching secondary framing.
  5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.
  6. Primary Framing Components: Provide Manufacturer's standard structural primary framing system, designed to withstand required loads and other specified requirements including profiles. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
    - a. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
  7. Primary Framing Preparation: All primary framing members shall be prepared in the shop for shop priming as follows. When the primary framing members arrive at the local priming shop, the manufacturer's shop primer shall be stripped and then prepared for local final priming as follows:
    - a. Shop Preparation: Prepare uncoated surfaces for shop priming according to SSPC-SP3 Powertool Cleaning for bents (rafters), and SSPC SP-6 Commercial Blast Cleaning for vertical leg members (columns).
  8. Primary Framing Priming and Finish: When the primary framing members arrive at the local priming shop, the manufacturer's shop primer shall be stripped and then prepared for local final priming. Prepare, prime and finish primary steel framing with same procedures and systems as specified in Division 5, Section "Structural Steel" and Division 9, Section "High Performance Coatings."
- D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
1. Secondary Framing Components: Manufacturer's standard secondary framing members, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet pre-painted with coil coating, unless otherwise indicated, to comply with the following:
    - a. Purlins: C- or Z-shaped sections; fabricated from minimum 0.0598-inch- (1.5-mm-) thick steel sheet, built-up steel plates, or structural-steel shapes; minimum 2-1/2-inch- (64-mm-) wide flanges
      - 1) Depth: Determined by metal building manufacturer's design, unless indicated otherwise on the Drawings.
      - 2) Finish: Galvanized at all buildings.
    - b. Flange Bracing: Minimum 2-by-2-by-1/8-inch (51-by-51-by-3-mm) structural-steel angles or 1-inch (25-mm) diameter, cold-formed structural tubing to stiffen primary frame flanges.
    - c. Sag Bracing: Minimum 1-by-1-by-1/8-inch (25-by-25-by-3-mm) structural-steel angles.

- d. Base or Sill Angles: Minimum 3-by-2-by-0.0598-inch (76-by-51-by-1.5-mm) zinc-coated (galvanized) steel sheet.
  - e. Purlin and Girt Clips: Minimum 0.0598-inch- (1.5-mm-) thick, steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
  - f. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from minimum 0.0598-inch- (1.5-mm-) thick, zinc-coated (galvanized) steel sheet.
  - g. Framing for Openings: Channel shapes; fabricated from minimum 0.0598-inch- (1.5-mm-) thick, cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.
  - h. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.
2. Make shop connections by welding or by using non-high-strength bolts.
  3. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.
- E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following and coordinated around mechanical floor framing and exterior wall framing:
1. End-Wall and Corner Columns: Rectangular HSS sections; I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch (1.5 mm).
  2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch (1.5 mm); or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
- F. Bracing: Provide adjustable wind bracing as follows:
1. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 (345); or ASTM A 529/A 529M, Grade 50 (345); minimum 1/2-inch- (13-mm-) diameter steel; threaded full length or threaded a minimum of 6 inches (152 mm) at each end.
    - a. Priming and Finish: Same as specified for Primary Framing Components.
  2. Cable: ASTM A 475, 1/4-inch- (6-mm-) diameter, extra-high-strength grade, Class B zinc-coated, 7-strand steel; with threaded end anchors.
  3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
    - a. Priming and Finish: Same as specified for Primary Framing Components.
  4. Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads. Coordinate rigid portal frame member sizes with architectural and structural drawings.
    - a. Priming and Finish: Same as specified for Primary Framing Components.
  5. Fixed-Base Columns: Not Permitted.



6. Bracing: Provide wind bracing using any method specified above, at manufacturer's option.

a. Priming and Finish: Match Primary framing if hot rolled, or Secondary framing if gauge sections.

G. Bolts: Provide plain finish bolts for structural-framing components that are primed or finish painted. Provide hot-dipped galvanized bolts for structural-framing components that are galvanized or at exterior conditions where exposed to the weather.

H. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.

1. Engage land surveyor to perform surveying.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

A. Transport metal building components specified herein to be locally prepared and primed to a local shop. Clean and prepare surfaces to be primed and painted as required hereinabove. Prime members, and transport back to site for erection painted according to high-performance coating manufacturer's written instructions for each particular substrate condition.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

- A. Erect metal building system according to manufacturer's written erection instructions and erection drawings.
- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
1. Set plates for structural members on wedges, shims, or setting nuts as required.
  2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure.
  2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.
- F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for bolt type and joint type specified.
    - a. Joint Type: Snug tightened or pretensioned.
- G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
  2. Locate and space wall girts to suit openings such as doors and windows.
  3. Locate canopy framing as indicated.

4. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.

1. Tighten rod and cable bracing to avoid sag.
2. Locate interior end-bay bracing only where indicated.

I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 PAINTING OF BUILDING SYSTEM COMPONENTS

A. See Division 7 Section “High Performance Coatings”.

3.5 INSTALLATION OF INSULATION RETAINAGE SYSTEMS

A. Install as recommended by the manufacturer for a complete system, leaving no gaps where cold air may penetrate. Seal all joints with tape as recommended by the manufacturer.

3.6 THERMAL INSULATION INSTALLATION FOR FIELD-ASSEMBLED METAL PANELS

A. General: Install insulation concurrently with metal wall panel installation, in thickness indicated to cover entire wall, according to manufacturer's written instructions.

1. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
3. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation.

B. Blanket Roof Insulation: Comply with the following installation method:

1. Two-Layers-between-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder facing tabs up and over purlin, overlapping adjoining facing of next insulation course maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
2. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
3. Thermal Spacer Blocks: Install thermal blocks above each purlin between the top layer of blanket insulation and below the metal roof panels. Where there is no blanket roof

insulation, install thermal blocks above each purlin between the roof purlin and the roof purlin with long screws with wide retaining washers.

### 3.7 RIGID WALL INSULATION PANELS

A. Install rigid panels in accordance with manufacturer's written instructions.

B. Coordinate all work in conjunction with the installation of metal wall panels, flashing, weather barriers, windows, louvers, doors, and other exterior systems.

### 3.8 METAL ROOF PANEL INSTALLATION, GENERAL

C. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.

1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seam locations of metal panels before metal panel installation.

D. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cut metal panels as required for roof openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.

a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.

2. Install metal panels perpendicular to structural supports unless otherwise indicated.

3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.

4. Lap metal flashing with metal panels to allow moisture to run over and off the material.

E. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

F. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.

1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.

2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.9 METAL ROOF PANEL INSTALLATION

- G. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
1. Install ridge caps as metal roof panel work proceeds.
  2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- H. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
1. Install clips to supports with self-drilling or self-tapping fasteners.
  2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
  4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.
  5. Provide metal closures at peaks, rake edges and each side of ridge caps.
- I. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.
- J. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.10 ACCESSORY INSTALLATION

- K. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
  2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
  3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

- 1 L. Flashing and Trim: Comply with performance requirements, manufacturer's written installation  
2 instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners  
3 where possible, and set units true to line and level as indicated. Install work with laps, joints,  
4 and seams that will be permanently watertight and weather resistant.
- 5 1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool  
6 marks and that is true to line and levels indicated, with exposed edges folded back to form  
7 hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and  
8 weather-resistant performance.
- 9 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space  
10 movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches  
11 (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions  
12 cannot be used or would not be sufficiently weather resistant and waterproof, form  
13 expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled  
14 with mastic sealant (concealed within joints).
- 15 M. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to  
16 eave with gutter hangers spaced as required for gutter size, but not more than 36 inches (914  
17 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with  
18 sealant. Provide for thermal expansion.
- 19 N. Downspouts: As specified in Division 5 Section "Metal Fabrications".
- 20 O. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to  
21 panel as recommended by manufacturer.
- 22 P. Bar-Type Snow Guards: Attach bar supports to vertical ribs of standing-seam metal roof panels  
23 with clamps or set screws. Do not use fasteners that will penetrate metal roof panels.
- 24 1. Provide snow guards at locations indicated on drawings.

25 3.11 FIELD QUALITY CONTROL

- 26 Q. Special Inspections: Owner may engage a qualified special inspector to perform the following  
27 special inspections:
- 28 1. Inspection of fabricators.
- 29 2. Steel construction.
- 30 R. Testing Agency: Owner may engage a qualified testing agency to perform tests and  
31 inspections.
- 32 S. Tests and Inspections:
- 33 1. High-Strength, Field-Bolted Connections: Connections shall be tested and inspected during  
34 installation according to RCSC's "Specification for Structural Joints Using ASTM A 325 or  
35 A 490 Bolts."

2. Welded Connections: In addition to visual inspection, field-welded connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:

- a. Liquid Penetrant Inspection: ASTM E 165.
- b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
- c. Ultrasonic Inspection: ASTM E 164.
- d. Radiographic Inspection: ASTM E 94.

T. Product will be considered defective if it does not pass tests and inspections.

U. Prepare test and inspection reports.

### 3.12 CLEANING AND PROTECTION

V. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

W. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

X. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

Y. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 133419





SECTION 133420 – FABRIC STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes all components for the complete installation of a pre-engineered fabric structure.

- B. Related Sections:

1. Division 03 Section "Concrete" for curbs and slab.
2. Division 26 for electrical systems incorporated into the fabric structure.

1.3 REFERENCES AND STANDARDS:

- A. The following publications are for the standards listed below but referred to within the document by basic letter designation only. They form a part of this specification to the extent referenced thereto:

1. American Institute of Steel Construction (AISC):

- a. S326-78 Design, Fabrication and Erection of Structural Steel Buildings
- b. S329-85 Structural Joints Using ASTM A325 or A490 Bolts

2. American Iron and Steel Institute (AISI):

- a. SG 503-76 The Design of Fabrication of Cold-Formed Steel Structures

3. American Society for Testing and Materials (ASTM):

- a. A 36-89 Structural Steel
- b. A 307-89 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- c. A 325-89 High-Strength Bolts for Structural Steel Joints
- d. A 500 A-90 Standard Specification for Cold Formed Welded And Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- e. A 563 Rev A-89 Carbon and Alloy Steel Nuts
- f. A 687-89 High-Strength Non-Headed Steel Bolts and Studs

4. American Society of Civil Engineers (ASCE) Minimum Design Loads for Building and Other Structures. Latest edition as required by State Code.

- a. ASCE 7-98 American Society of Civil Engineers
- b. ASCE 7-02 American Society of Civil Engineers
- c. ASCE 7-05 American Society of Civil Engineers

1.4 ACTION SUBMITTALS

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

B. Shop Drawings:

- 1. Plan, elevation, section, and detail drawings showing all framing, openings, anchorage, fabric fastening, and accessories necessary for a complete system..

C. Buy America: Certification that all steel components are provided in compliance with the Buy America requirements.

D. Samples for Verification

- 1. Fabric material

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Material Certificates: For fabric, structural frame, fasteners

C. Minutes of preinstallation conference.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For interior and exterior fabric.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer, approved by the fabric structure manufacturer, whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm with a minimum of five years manufacturing fabric structures similar to the size and type specified herein, with documented record of successful installations.

C. Source Limitations: Building shall be manufactured by a single company, under one business name.

D. Building prefabrication shall be performed under factory conditions in a plant specifically arranged for this type of work. Contractor shall provide adequate space, equipment, personnel and technical ability to coordinate the assembly and factory prefabrication of all major components of the work and all necessary operation in the packing, shipping and installation procedures. No fabrication shall be done unless the materials have been tested and approved.

E. Mockups: Not Required.

F. Pre-installation Conference

1. Attendees:

- a. General Contractor
- b. Fabric structure manufacturer's rep
- c. Installer
- d. Owner
- e. Architect

2. Pre-installation Conference Agenda

- a. Order and Method of Construction
- b. Foundations
- c. Safety
- d. Notifications
- e. Redundancy
- f. Emergency Procedures
- g. Other

G. Warranty

- 1. Fabric: 10 years
- 2. Steel Frame: 50 years

## 1.8 DELIVERY, STORAGE, AND HANDLING

A. Material Delivery: The building system materials shall be delivered to the project site during normal working hours on weekdays. (6:30am to 3:30pm). 24 hours advanced notice for delivery is required. Installation contractor will provide adequate workmen and equipment to promptly unload, inspect and accept material delivery.

B. Handling: At no time shall materials be dropped, thrown or dragged over the transport equipment or the ground. Damage to any piece under its own or superimposed weight shall be cause for repair or replacement by the vendor or contractor.

C. Piece marking and Identification: all individual parts or bundles and packages of identical parts are to be clearly marked for identification. Bolts, nuts, washers and fasteners shall be packaged

according to type, size and length. Shipping documentation shall include a list showing the description, quantity and piece mark of the various parts, components and elements.

- D. Short, damaged or excess materials: Installation contractor shall inspect, count and verify quantities based on the shipping documents.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Basis of Design product by CLEARSPAN FABRIC STRUCTURES INTERNATIONAL, Inc. South Windsor, CT. or a comparable product fabricated in the U.S.A. and manufactured by one company with a minimum of 5 years documented experience manufacturing the specified building model under one business name. Substitute shall be approved during the bid process per Specification Sections 002100 and 012500.

### 2.2 GENERAL DESIGN REQUIREMENTS:

#### A. General Design:

1. The membrane shall be tensioned over the framework.
2. The structure shall be rectangular in shape with 2 closed vertical gable end walls.
3. The interior of the structure below the main trusses shall be clear span free of any structural support members and shall provide unobstructed floor space.
4. No exterior purlins, guy ropes or cables shall be used for anchoring the structure.

#### B. Design Requirements-Structural Frame:

1. Purlin Spacing: To provide for structural stability and to provide for installation of accessory items, the main structural trusses shall be laterally braced by tubular purlins at intervals required by the truss design.
2. Wind and Frame Bracing: The structure shall be appropriately stabilized with wind bracing cable as well as any required secondary node restraint assemblies so as to efficiently transfer wind, snow and seismic induced stresses to the foundation/anchoring system. The end bays of the structure shall be designed to be X – braced early during installation to allow for permanent stability of the frame during installation.
3. Connecting Joints: Connections between structural elements shall be designed so as to transfer the compressive and tensile forces present in a given joint. A minimum of Grade 5 bolts shall be used at each truss chord joint. Primary axial steel, secondary purlins and end wall frame connections shall be made with a minimum of Grade 5 hex bolts, carriage bolts and self drilling screws.
4. Mechanical Equipment Interface: The main structural roof trusses shall allow for installation of electrical and mechanical equipment based on collateral loads. Likewise, the structure shall

- accept penetrations through the membrane for access doors and mechanical services with minimal modification.
5. Ancillary Systems: The structure shall be designed such that it can be readily retrofitted with insulation systems and other ancillary systems such as lighting, sprinklers, HVAC, provided collateral load factors are taken into account.
6. Alternative Cladding materials: The structure shall be designed such that alternative covering materials such as metal wall cladding can be added with minimal modification, if required.
7. All hardware needed to assemble building to be supplied by vendor / contractor.
8. 25' Wide X 60' Long HB style frame mounted to an owner designed foundation. Minimum rafter spacing of 15'. No exceptions.
9. One end-wall partially enclosed with 1 ea 36" passage door and vent.
10. Opposing end enclosed with 1 ea 12'x12' steel coil door, 1 36" passage door, and vent.
11. Building to be engineered to 25 psf ROOF snow load and 110 mph, 3 sec gust: See Engineered Design Criteria (below) for details.
- a. 25 psf roof snow load non-reducible.
- b. 25 plf collateral load.
- c. Category II importance (occupied with nor more than 300 people)

C. Design Requirements – Membrane Cladding System:

1. Membrane: The roof membrane shall form a weather tight shell over the structural frame. In order to provide for a good finished appearance and to insure weather tightness, the membrane shall be assembled and tensioned in a manner that minimizes wrinkles in hot and cold temperatures.
2. The gable wall membrane cladding shall be manufactured and connected to form one piece to the adjacent end wall and roof cladding.
3. Roof membrane horizontal stretch shall be maintained with horizontal purlins requiring no ongoing maintenance.
4. Base Tensioning System: The membrane cladding will be provided with a mechanical tensioning system that allows the membrane to be fully tensioned around the structure perimeter. The system will be designed such that the membrane can be tightly and neatly secured over the structural frame and such that the system has remaining range of adjustment.
5. Membrane Seal at Openings and Base: The Dealer supplying the structure will provide all materials and methods necessary to fully tension and seal the membrane material around all doors, ventilation and other opening as well as around the structure perimeter below the main tensioning system. This seal shall provide a neat and finished appearance and eliminate any loose membrane cladding that would otherwise be damaged by flapping or abrasion. When a membrane base skirt is required, this shall be supplied and attached at the base perimeter to allow a reasonable seal against air and water intrusion.
6. The membrane shall not be designed to function as a structural member such that, should any damage to or penetrations of the membrane occur, the integrity of the structural framework shall not be affected.
7. The Contractor shall provide drawings and calculations acceptable to the architect/Engineer of the Record, meeting the provisions of the applicable State Building Code. The Contractor shall bear all costs for production of drawings and associated structural calculations.

Contractor shall make all revisions and corrections to those documents required for approval and shall resubmit as required to obtain approvals.

### 2.3 ENGINEERED DESIGN CRITERIA

- A. The structure shall be designed using methodology as per ASCE 7 standard referenced from the applicable building code. Primary and secondary framing shall comply with current issues of ISC, AISI, NEMA and ASTM specification, as applicable.
- B. Structural members shall be designed using Allowable Stress Design (ASD) or Load Resistance Factored Design (LRFD) for the design loads given below. Wind load factors and coefficients used in design of structural members must be in accordance with the applicable ASCE 7 guidelines.
- C. Snow Loads: The structure shall be designed based upon a minimum ROOF snow load of 25 pounds per square foot (Psf) (non-reducible)
- D. Wind Loads: The structure shall be capable of withstanding a basic wind speed (3-second gust) from any direction of 110 miles per hour. The design wind pressure shall be based on an exposure category of “C” and appropriate wind load factors and coefficients in accordance with the applicable referenced ASCE 7 guidelines. In no event shall the wind load used in the design of the main wind force resisting system be less than 10 pounds per square foot multiplied by the area of the building or structure projected on a vertical plane that is normal to the wind direction.
- E. Rainfall: The structure shall be capable of withstanding the effects of rainfall up to 4 inches per hour for at least 2 hours.
- F. Design Loads: The design shall be based as a minimum on the following design loads. Each member shall be designed to withstand stresses resulting from combinations of design loads that produce maximum percentage of actual to allowable stress in that member as per referenced ASCE 7 standard from applicable building code.
  - 1. D = Dead Load + Collateral Load
  - 2. S = Symmetrical Snow or Live Load (Balanced or Unbalanced)
  - 3. Ws = Wind with internal suction
  - 4. Wp = Wind with internal pressure
  - 5. E = Earthquake

### 2.4 OPERATION AND USE:

- A. The main structure frame shall be designed to provide a minimum of 15-year operational use period with appropriate inspection and maintenance. Owner’s manual shall be provided.
- B. The structure shall be capable of being assembled, operated and dismantled in all ambient temperatures between -20 °F and 120 °F.

- C. The structure shall be capable of being erected on concrete and of accepting differential settlement of up to 1 ½% between truss positions.

2.5 MATERIALS:

- A. All materials used in the structure shall be new, without defects and free of repairs. The quality of the materials used shall be such that the structure is in conformance with the performance requirements specified herein.

- B. Cladding Membrane: The structure shall be clad with a flame retardant polyolefin fabric manufactured by an approved and reputable supplier with demonstrated long-term performance. The polyolefin membrane fabric shall be waterproof and free from defects. All roofs, walls, end walls and connecting sections shall be weather tight. The material shall be selected from the manufacturer's standard colors for the sidewalls and roof panels.

- C. The material scrim and coating shall be UV stabilized. The minimum fabric specification is as follows:

1. Total Fabric Weight	12.0 oz/yd <sup>2</sup> (407 g/m <sup>2</sup> ) +/- 5%
2. Coating Thickness	4 mil average, each side
3. Finished Thickness	23 mils (ASTM D5199)
4. Grab Tensile Strength	355 lbs (ASTM D5034)
5. Strip Tensile Strength	270 lbs/in (ASTM D5035)
6. Tongue Tear Strength	115 lbs (ASTM D2261)
7. Trapezoidal Tear	95 lbs (ASTM D-4533)
8. Mullen Burst	675 psi (ASTM D3786)
9. Cold Crack Resistance	-60 °C (ASTM D2136)
10. UV Resistance & Weathering	>90% retention after 2000 hrs. ASTM G151

- D. Metal: The main structure shall consist of welded truss arches with parallel tube chords separated apart by webbing. Parallel tube cords are made from triple coated, in-line galvanized structural steel tubing, cold-formed and induction welded of modified grade carbon steel, providing a finished tubular product with exceptional mechanical and corrosion resistant properties.

- E. Tolerances: All dimensional tubing tolerances shall comply with ASTM A500, Section 10.

- F. Tubing shall be manufactured using steel conforming to ASTM A568 and ASTM A1011. Finished steel tubing used in the structure shall have the following minimum structural and mechanical properties based on standard ASTM A500:

1. Tension Ultimate: 55 KSI and Yield: 50 KSI

- G. Corrosion Protection: All steel tube components, trusses, purling, fastening tubes shall be coated, on the exterior, with a gloss finishing providing a corrosion resistance of 1800 hours as per ASTM B117-90;

- H. Coatings: Zinc conforms to ASTM B6, Standard Specifications for Zinc, High Grade (1.1.3.) and Special High Grade (1.1.2.).
1. Exterior: In-line galvanized to a normal coating zinc weight of 0.6 oz/ft<sup>2</sup>. Chromate conversion coating applied over the galvanized surface to provide additional corrosion protection. Clear organic polymer applied as the top surface coat to retard oxidation, enhance surface appearance and provide a primer for subsequent painting or powder coating processes as desired.
  2. Interior: Full zinc based organic coating applied to 100% of the interior surface as a corrosion barrier.

2.6 HARDWARE:

- A. Bolts: Bolts subject to extreme stress and wear shall be structural bolts of Grade 5 and plated/galvanized that has been upgraded with a corrosion resistant topcoat finish. All bolts shall be installed and securely torqued so as to prevent change in tightness. Those subject to removal or adjustment shall not be swaged, peened, staked or otherwise installed.
- B. Membrane Tensioning Hardware: The fabric membrane shall be tensioned with load rated hardware. Hardware shall allow full and free rotation at the foundation connection to avoid fatigue of threaded assemblies.
- C. Membrane Tensioning Webbing: The membrane shall be tensioned with load-tested tie-downs.
- D. Cable Assemblies: Main and wind bracing cable assemblies shall be manufactured to the required length and press swaged with metal sleeves. The cables are manufactured using performed galvanized cables, sized with appropriate safety factors.
- |    |            |   |             |
|----|------------|---|-------------|
| 1. | 3/16" dia. | = | 4,200 lbs.  |
| 2. | 1/4" dia.  | = | 7,000 lbs.  |
| 3. | 5/16" dia. | = | 9,800 lbs.  |
| 4. | 3/8" dia.  | = | 14,400 lbs. |
| 5. | 1/2" dia.  | = | 22,800 lbs. |
- E. Other Fasteners: Non-structural fasteners such as wood screws, Tek screws, etc., shall be standard commercial quality.
- F. Exterior Trim: The aluminum alloy used in the extrusion shall meet or exceed 6063-T5.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.



1        B.     Before erection proceeds, survey elevations and locations of concrete- bearing surfaces and  
2               locations of anchor rods, bearing plates, and other embedments to receive structural framing, with  
3               erector present, for compliance with requirements and fabric structure system manufacturer's  
4               tolerances.

5        C.     Proceed with erection only after unsatisfactory conditions have been corrected.

6    3.2       MATERIAL DELIVERY AND HANDLING

7    3.3       ERECTION OF STRUCTURAL FRAMING

8        A.     Erect fabric structural system according to manufacturer's written erection instructions and erection  
9               drawings.

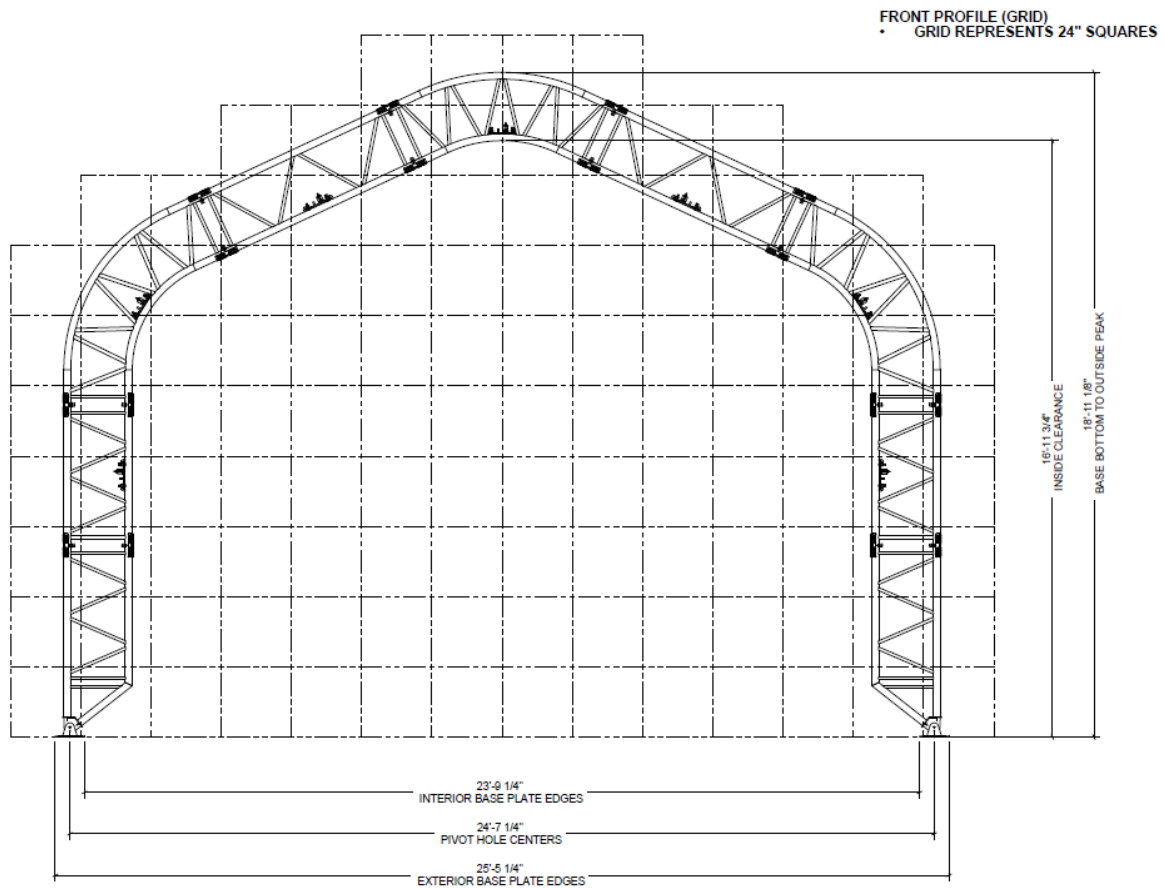
10   3.4       FIELD QUALITY CONTROL

11       A.     Special Inspections: Perform special inspection if required by the Jurisdiction having Authority.

12       B.     Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.

13   Sample Elevation Drawing

14



1

2 END OF DOCUMENT

## **SECTION 13 60 00**

### **FABRICATED EQUIPMENT**

#### **PART 1 - GENERAL**

The General Provisions of the Contract, including General and Special Conditions and the requirements of Division 1, apply to the Work in this Section.

##### **1.1 WORK INCLUDED**

- A. Equipment items as listed below by Equipment Mark Number:
  - 1. DROPS, AIR/ELECTRIC, TRAPEZE  
Equipment Mark Number: 8190
- B. Contractor shall fabricate and provide item per specifications.
- C. Contractor shall install equipment with labor, services, and incidentals necessary for complete and operational equipment installation.

##### **2.1 ALTERNATIVE BIDS**

- A. Refer to Division 1 - General Requirements for possible effect on Work of this Section.

##### **3.1 QUALITY ASSURANCE**

- A. Experience: Equipment shall be manufactured by a manufacturer of established reputation with a minimum of five years experience performing similar fabrication techniques.

##### **4.1 SUBMITTALS**

- A. Refer to Section 11 06 00 Equipment Schedule for submittal requirements listed in the "Submittals" column of the equipment list. In the event of conflict between Section 11 06 00 Equipment Schedule and the following expanded submittal descriptions, Section 11 06 00 Equipment Schedule is to govern.
- B. Submit Shop Drawings in accordance with Division 1 -General Requirements of these specifications. Refer to Section 11 06 00 Equipment Schedule for the equipment mark numbers requiring shop drawings.
  - 1. Submitted shop drawings shall be project specific and shall include a minimum 1/8 inch to 1 foot scaled (or larger standard architectural imperial scale), dimensioned, graphical representation of the size, orientation, and location for the submitted equipment. The drawings shall further include dimensions from structural elements or architectural grid lines, operational clearances, locations of any utility

service connection points, mounting requirements, and structural supports required for the submitted equipment.

**5.1 WARRANTY**

- A. Warrant work specified herein for one year from substantial completion against defects in materials, function and workmanship.
- B. Warranty shall include materials and labor necessary to correct defects.
- C. Defects shall include, but not be limited to loose, damaged, and missing parts and abnormal deterioration of finish.
- D. Submit warranties in accordance with Division 1 - General Requirements of these specifications.

**6.1 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver equipment appropriately packaged and/or crated for protection during shipment and storage in humid, dusty conditions.
- B. Indelibly label all containers, including those contained in others, on outside with item description(s) per title and Mark Number of this specification.
- C. Provide equipment and materials specified complete in one shipment for each equipment item. Split or partial shipments are not permissible.

**PART 2 – PRODUCTS**

**2.1 DROPS, AIR/ELECTRIC, TRAPEZE**  
Equipment Mark Number: 8190

- A. Capacities and Dimensions:
  - 1. Dimensions, frame:
    - a. Width: 24 inches.
    - b. Depth: 2-1/4 inches.
    - c. Height: As shown.
  - 2. Installation height: 78 inches to lowest point of assembly, excluding accessories.
- B. Features and Construction:
  - 1. Frame: Unit shall be fabricated from 2 by 1 by 1/8 inch rectangular hollow structural steel.

2. Supports: Welded link, 1/4 inch proof coil chain shall be attached to trapeze frame with eyebolts and to overhead structure with appropriate shackles.
  3. Welds: Frame welds shall be continuous meeting American Welding Society standards.
  4. Electrical:
    - a. 120 VAC quadraplex outlet and rigid conduit shall be mounted to frame with U-bolt supports.
    - b. Connection: Flexible conduit shall be used to connect building and trapeze rigid conduit.
  5. Air: Trapeze air piping and principal devices shall be as follows starting at building air piping.
    - a. Cut-off valve: 3/4 inch, ARO No. 61754-2 or approved equal, one each at connection to building air piping.
    - b. Connection: Flexible air line shall be used to connect building and trapeze piping.
    - c. Main leg and horizontal manifold: 3/4 inch, black steel pipe.
    - d. Drain valve: 3/4 inch, ARO No. 61754-2 or approved equal, one each at bottom of main leg.
    - e. Filter/regulator/lubricator: ARO No. 28358 or approved equal shall be installed as shown. Lubricator shall be filled with oil per manufacturer's recommendations. Oil shall be of a type specifically designed and produced for industrial grade air tool equipment, having an SAE (Society of Automotive Engineers) viscosity grade between 10 and 20, a flashpoint no less than 350 degrees Fahrenheit, and a pour point no higher than -20 degrees Fahrenheit.
    - f. Quick disconnect couplings: 3/8 inch female quick disconnect coupling, ARO No. 23103-300 and 1/2 inch female quick disconnect coupling, ARO No. 23104-400 shall be installed as shown with elbows as needed for couplings to point downward.
  6. Bracing: Piping shall be substantially bracketed to frame including inlet and outlet piping from air filter/lubricator/regulator assembly.
  7. Miscellaneous: All materials, fittings, and connectors as required for a complete and operable installation shall be provided by Contractor.
- C. Utilities Available:
1. Electrical: 120 VAC, 20 A.

- 2. Compressed air: 3/4 inch, up to 150 PSI.
- D. Finish: Cover frame with epoxy compatible zinc chromate primer and finish coat of safety yellow epoxy enamel.
- E. Manufacturers Reference: Fabricated item as shown on EQ drawings.

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION**

- A. Coordinate location of rough-in work and utility stub-outs to assure match and/or non-interference with equipment to be installed.
- B. Inspect delivered equipment for damage from shipping and exposure to weather. Compare delivered equipment with packing lists and specifications to assure receipt of all items.

#### **3.2 INSTALLATION**

- A. Perform work under direct supervision of Foreman or Construction Superintendent with authority to coordinate installation of scheduled equipment with Architect.
- B. Install equipment in accordance with plans, shop drawings and manufacturer's instructions:
  - 1. Positioning: Place equipment in accordance with any noted special positioning requirements generally level, plumb and at right angles to adjacent work.
  - 2. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging equipment or adjacent work.
  - 3. Anchorage: Attach equipment securely to floor, as directed by Architect, to prevent damage resulting from inadequate fastening. Installation fasteners shall be installed to avoid scratching or damaging adjacent surfaces.
  - 4. Upon completion of work, finish surfaces shall be free of tool marks, scratches, blemishes, and stains.

#### **3.3 TESTING**

- A. After final connections are made and prior to authorizing payment, specified equipment shall be tested for compliance with specifications in the presence of the Architect using acceptance procedures provided by the manufacturer.

#### **3.4 CLEANUP**

- A. Touch-up damage to finishes.
- B. Wipe and clean equipment of any oil, grease, and solvents, and make ready for use.
- C. Clean area around equipment installation and remove packing or installation debris from job site.

- D. Notify Architect for acceptance inspection.

END OF SECTION 13 60 00

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