

Exhibit-C: Specifications Volume 2, dated June 09, 2023

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21 **PART 1 - GENERAL**

22 **1.1 SUMMARY**

- 23 A. Section Includes:
- 24 1. Demolition and removal of selected portions of building or structure.
 - 25 2. Demolition and removal of selected site elements.
 - 26 3. Removal of portions of the existing floor slab to allow trenching and installation of below slab utilities.
 - 27 4. Salvage of existing items to be reused or recycled.
 - 28 5. Cleaning of contaminants and accumulated debris from interior surfaces.
- 29 B. Related Requirements:
- 30 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 31 2. Section 09 91 23 "Interior Painting" for surface preparation of existing surfaces to be repainted.

32 **1.2 MATERIALS OWNERSHIP**

- 33 A. Unless otherwise indicated, demolition waste becomes property of Contractor.

34 **1.3 PREINSTALLATION MEETINGS**

- 35 A. Pre-demolition Conference: Conduct conference at Project site.

36 **1.4 SUBMITTALS**

- 37 A. Inventory of existing surfaces to be cleaned and methods to be used for cleaning.
- 38 B. Submit a coordinated slab trenching and removal plan.
- 39 1. Provide a document graphically indicating the full scope of the work required to remove and install
40 below existing slab work.

41 **1.5 INFORMATIONAL SUBMITTALS**

- 42 A. Engineering Survey: Submit engineering survey of condition of building.
- 43 B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed
44 for protecting individuals and property, for environmental protection, for dust control and for noise control.
45 Indicate proposed locations and construction of barriers.
- 46 C. Schedule of selective demolition activities with starting and ending dates for each activity.
- 47 D. Statement of Refrigerant Recovery:

48 **1.6 CLOSEOUT SUBMITTALS**

- 49 A. Inventory of items that have been removed and salvaged.

50 **1.7 QUALITY ASSURANCE**

- 51 A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1 **1.8 FIELD CONDITIONS**

- 2 A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
3 1. Before selective demolition, Owner will remove the following items:
4 a. All loose interior furnishings and office equipment, art work, maintenance equipment, tools
5 and parts.
6 B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective
7 demolition.
8 C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
9 1. Hazardous materials will be removed by Owner.
10 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and
11 Owner. Hazardous materials will be removed by Owner under a separate contract.
12 D. Storage or sale of removed items or materials on-site is not permitted.
13 E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage
14 during selective demolition operations.

15 **1.9 WARRANTY**

- 16 A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during
17 selective demolition, by methods and with materials and using approved contractors so as not to void existing
18 warranties.

19 **PART 2 - PRODUCTS**

20 **2.1 PERFORMANCE REQUIREMENTS**

- 21 A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective
22 demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
23 B. Standards: Comply with ASSE A10.6 and NFPA 241.
24 C. Sustainable Design Requirements for Building Reuse:
25 1. Maintain existing building structure (including structural floor and roof decking) and envelope (exterior
26 skin and framing, excluding window assemblies and nonstructural roofing material) not indicated to
27 be demolished; do not demolish such existing construction beyond indicated limits.
28 2. Maintain existing interior nonstructural elements (interior walls, doors, floor coverings, and ceiling
29 systems) not indicated to be demolished; do not demolish such existing construction beyond
30 indicated limits.
31 3. Maintain existing nonshell, nonstructural components (walls, flooring, and ceilings) not indicated to
32 be demolished; do not demolish such existing construction beyond indicated limits.

33 **2.2 SELECTIVE DEMOLITION**

- 34 A. Scope of selective demolition, salvage and building elements to remain protected are indicated by demolition
35 tags with definitions on the Material Tag List. Refer to Demolition Drawings.
36 B. Salvage of existing items to be reused or recycled.
37 1. Items to be reused shall be inspected, cleaned and repaired appropriate for application of re-use.

38 **2.3 CLEANING OF EXISTING SURFACES**

- 39 A. Scope: The existing building interior surfaces of the building structure (including structural floor and roof
40 decking), interior nonstructural elements (interior walls, doors, floor coverings, and ceiling systems) not
41 indicated to be demolished shall be cleaned of accumulated contaminants and debris.
42 B. Intent: Surface shall be cleaned using the least aggressive methods to preserve the existing surface and
43 finish. Existing finishes, once cleaned, shall be inspected to assess if the finish is acceptable as the contract
44 finish.
45 1. Existing surfaces and finishes which are to remain shall be maintained prior to commencing the new
46 Work.
47 C. Goal: Commence new work without performing subsequent surface cleaning, out of sequence, and
48 disruptive to the construction schedule.
49 D. Quality Control: Surfaces shall be cleaned of debris and surface particulate. Existing surfaces that are within
50 zone of physical contact by building occupants shall be treated with a solution to neutralize the Ph of the
51 remaining surface finish.
52 E. Inspections: Owner shall provide Health Department services to inspect surfaces that will be required to
53 comply with regulations for food storage, preparation and distribution.

1 **PART 3 - EXECUTION**

2 **3.1 EXAMINATION**

- 3 A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
4 B. Perform an engineering survey of condition of building to determine whether removing any element might
5 result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during
6 selective building demolition operations.
7 C. Inventory and record the condition of items to be removed and salvaged.
8 D. At completion of selective demolition provide inventory of existing surfaces and finishes to remain (not
9 including surfaces scheduled for refinishing) that are to be cleaned.
10 1. Inventory shall include assessment of surface contaminants and surface finish condition.

11 **3.2 PREPARATION**

- 12 A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to
13 40 CFR 82 and regulations of authorities having jurisdiction.

14 **3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS**

- 15 A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them
16 against damage.
17 1. City will maintain the wireless access points and service in the existing building.
18 B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal
19 or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
20 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
21 2. Arrange to shut off utilities with utility companies.
22 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary
23 services/systems that bypass area of selective demolition and that maintain continuity of
24 services/systems to other parts of building.
25 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems,
26 equipment, and components indicated on Drawings to be removed.
27 a. Piping to Be Removed: Remove piping indicated. Remove abandoned conduit and ductwork,
28 including above ceilings. Remove back to source of supply where possible, otherwise cap
29 stub and tag with identification.
30 b. Piping to Be Abandoned in Place: Abandon piping, conduit and ductwork in place only if
31 removal would disturb existing material and construction to remain. Drain piping and cap or
32 plug piping with same or compatible piping material and leave in place.
33 c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
34 d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean,
35 and store equipment; when appropriate, reinstall, reconnect, and make equipment
36 operational.
37 e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove
38 equipment and deliver to Owner.
39 f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining
40 ducts with same or compatible ductwork material.
41 g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork
42 material and leave in place.

43 **3.4 PROTECTION**

- 44 A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to
45 people and damage to adjacent buildings and facilities to remain.
46 B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to
47 preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and
48 to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
49 C. Remove temporary barricades and protections where hazards no longer exist.
50

1 **3.5 SELECTIVE DEMOLITION**

- 2 A. General: Demolish and remove existing construction only to the extent required by new construction and as
3 indicated. Use methods required to complete the Work within limitations of governing regulations and as
4 follows:
- 5 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods
6 least likely to damage construction to remain or adjoining construction. Use hand tools or small power
7 tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to
8 remain.
 - 9 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing
10 finished surfaces.
 - 11 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces,
12 such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-
13 cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 14 4. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
 - 15 5. Locate selective demolition equipment and remove debris and materials so as not to impose
16 excessive loads on supporting walls, floors, or framing.
 - 17 6. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19
18 "Construction Waste Management and Disposal."
- 19 B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure
20 minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- 21 C. Removed and Salvaged Items:
- 22 1. Clean salvaged items.
 - 23 2. Pack or crate items after cleaning. Identify contents of containers.
 - 24 3. Store items in a secure area until delivery to Owner.
 - 25 4. Prepare items for Owner's storage area.
- 26 D. Removed and Reinstalled Items:
- 27 1. Clean and repair items to functional condition adequate for intended reuse.
 - 28 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 29 3. Protect items from damage during transport and storage.
- 30 E. Existing Items to Remain:
- 31 1. Protect construction indicated to remain against damage and soiling during selective demolition.
- 32 F. Existing Surfaces to be Cleaned;
- 33 1. Provide surface cleaning after selective demolition is complete.
- 34 G. Remove demolition waste materials from Project site and recycle or dispose of them according to
35 Section 01 74 19 "Construction Waste Management and Disposal."
- 36 1. Do not allow demolished materials to accumulate on-site.
 - 37 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 38 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey
39 debris to grade level in a controlled descent.
 - 40 4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and
41 Disposal."
- 42 H. Burning: Do not burn demolished materials.
- 43 I. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition
44 operations. Return adjacent areas to condition existing before selective demolition operations began.

45 **END OF SECTION**

SECTION 03 01 30

MAINTENANCE OF CAST-IN-PLACE CONCRETE

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PART 3 – EXECUTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Removal of deteriorated and contaminated SOG concrete surfaces and patching as required (EPOXY-2).
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 03 30 00 "Cast-In-Place Concrete" for concrete requirements.
 - 3. Section 03 35 43 "Polished Concrete Finishing".
 - 4. Section 01 43 39 – Mockups for description of construction required to complete a mockup submittal for review.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.
- B. Sustainability:
 - 1. Health Product Declaration. Submit complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.
 - 2. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
 - a. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
 - 3. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 4. Regional Materials: Products shall be manufactured within 500 miles of Project site.
 - 5. Product Data: Certification of product manufacturing origin.

1 **1.5 QUALITY ASSURANCE**

- 2 A. Manufacturer Qualifications: Each manufactured bonding-agent, cementitious and patching-mortar,
3 manufacturer shall employ factory-trained technical representatives who are available for consultation and
4 Project-site inspection and assistance at no additional cost.
5 B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
6 manufacturer to apply packaged patching-mortar materials and polymer sealers.
7 C. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and
8 execution.
9 1. Removal and Patching: Remove and repair an approximately 50 sq. ft. area of deteriorated
10 concrete.
11 2. Approval of mockups does not constitute approval of deviations from the Contract Documents
12 contained in mockups unless Architect specifically approves such deviations in writing.
13 3. Subject to compliance with requirements, approved mockups may become part of the completed
14 Work if undisturbed at time of Substantial Completion.

15 **1.6 DELIVERY, STORAGE, AND HANDLING**

- 16 A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and
17 other conditions for storage.
18 B. Store cementitious materials off the ground, under cover, and in a dry location.
19 C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and
20 prevent contamination.

21 **1.7 FIELD CONDITIONS**

- 22 A. Cold-Weather Requirements for Cementitious Materials: Do not apply unless concrete-surface and air
23 temperatures are above 40 deg F and will remain so for at least 48 hours after completion of Work.
24 B. Cold-Weather Requirements for Cementitious Materials: Comply with the following procedures:
25 1. When air temperature is below 40 deg F, heat patching-material ingredients and existing concrete
26 to produce temperatures between 40 and 90 deg F.
27 2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with
28 weather-resistant insulating blankets for 48 hours after repair or provide enclosure and heat to
29 maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
30 3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain
31 temperatures above 32 deg F within the enclosure for 48 hours after repair.
32 C. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and
33 humidity conditions produce excessive evaporation of water from patching materials. Provide artificial
34 shade and wind breaks, and use cooled materials as required. Do not apply to substrates with
35 temperatures of 90 deg F and above.

36 **PART 2 - PRODUCTS**

37 **2.1 MATERIALS, GENERAL**

- 38 A. Source Limitations: Obtain each color, grade, finish, type, and variety of product from single source with
39 resources to provide products of consistent quality in appearance and physical properties.
40 B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

41 **2.2 BONDING AGENTS**

- 42 A. Latex Bonding Agent: ASTM C 1059/C 1059M, Type I at interior locations.
43 1. Products: Subject to compliance with requirements, available products that may be incorporated
44 into the Work include, but are not limited to, the following:
45 a. Latex Bonding Agent, Type I (Redispersible):
46 1) Dayton Superior Corporation; Superior Concrete Bonder (J-41) Conspec, Weldtite.
47 2) Euclid Chemical Company (The), an RPM company; Euco Weld, Tammsweld.
48 3) L&M; Everweld
49 4) W. R. Meadows, Inc.; Intralok.

50 **2.3 PATCHING MORTAR**

- 51 A. Patching Mortar, General:
52 1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal
53 use orientation.
54 2. Product shall be suitable for polishing. Refer to Section 03 35 43 "Polished Concrete Finishing".

- 1 3. Color and Aggregate Texture: Provide patching mortar and aggregates of colors and sizes
2 necessary to produce patching mortar that matches existing, adjacent, exposed concrete. Blend
3 several aggregates if necessary to achieve suitable matches.
- 4 4. Coarse Aggregate for Patching Mortar: ASTM C 33, washed aggregate, Size No. 8, Class 5S. Add
5 to patching-mortar mix only as permitted by patching-mortar manufacturer.
- 6 B. Polymer-Modified, Cementitious Patching Mortar: Packaged, dry mix for repair of concrete and that
7 contains a latex additive as either a dry powder or a separate liquid that is added during mixing.
 - 8 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
9 that may be incorporated into the Work include, but are not limited to, the following:
 - 10 a. Dayton Superior Corporation; Recrete 20.
 - 11 b. Euclid Chemical Company (The); an RPM company; Eucopatch.
 - 12 c. L&M; Fastrak 15.
 - 13 d. W. R. Meadows, Inc; Meadow Patch 20.
 - 14 2. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C 109/C
15 109M.

16 2.4 OTHER MATERIALS

- 17 A. Portland Cement: ASTM C 150, Type I, II, or III unless otherwise indicated.

18 2.5 MIXES

- 19 A. General: Mix products, in clean containers, according to manufacturer's written instructions.
 - 20 1. Do not add water, thinners, or additives unless recommended by manufacturer.
 - 21 2. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in
22 proper proportions. When premeasured packages are not used, measure ingredients using
23 graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of
24 measure.
 - 25 3. Do not mix more materials than can be used within time limits recommended by manufacturer.
26 Discard materials that have begun to set.
- 27 B. Dry-Pack Mortar: Mix patching-mortar dry ingredients with just enough liquid to form damp cohesive
28 mixture that can be squeezed by hand into a ball but is not plastic.
- 29 C. Concrete: Comply with Section 03 30 00 "Cast-in-Place Concrete."

30 PART 3 - EXECUTION

31 3.1 EXAMINATION

- 32 A. Notify Architect seven days in advance of dates when areas of deteriorated or delaminated concrete will
33 be located.
- 34 B. Refer to Drawings for areas requiring resurfacing.
- 35 C. Determine depth of contaminated concrete floor surface by sample coring.

36 3.2 PREPARATION

- 37 A. Ensure that supervisory personnel are on-site and on duty when concrete maintenance work begins and
38 during its progress.
- 39 B. Preparation for Removal of Deteriorated Concrete: Examine construction to be repaired to determine best
40 methods to safely and effectively perform concrete maintenance work. Examine adjacent work to
41 determine what protective measures will be necessary. Make explorations, probes, and inquiries as
42 necessary to determine condition of construction to be removed in the course of repair.
 - 43 1. Verify that affected utilities have been disconnected and capped.
 - 44 2. Inventory and record the condition of items to be removed for reinstallation or salvage.
 - 45 3. Protect floors and other surfaces along haul routes from damage, wear, and staining.
- 46 C. Concrete Removal:
 - 47 1. Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch.
 - 48 2. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
 - 49 3. Remove additional concrete if necessary to provide a depth of removal of at least 1 inch over entire
50 removal area.
 - 51 4. To be confirmed by core samples and mock-up.
 - 52 5. Thoroughly clean removal areas of loose concrete, dust, and debris.

- 1 **3.3 APPLICATION**
- 2 A. General: Comply with manufacturer's written instructions and recommendations for application of products,
- 3 including surface preparation.
- 4 B. Latex Bonding Agent, Type I: Apply to concrete by brush roller or spray. Allow to dry before placing
- 5 patching mortar or concrete.
- 6 C. Placing Patching Mortar: Place as follows unless otherwise recommended in writing by manufacturer:
- 7 1. Provide forms where necessary to confine patch to required shape.
- 8 2. Wet substrate and forms thoroughly and then remove standing water.
- 9 3. General Placement: Place patching mortar by troweling toward edges of patch to force intimate
- 10 contact with edge surfaces. For large patches, fill edges first and then work toward center, always
- 11 troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill
- 12 space behind bars by compacting with trowel from sides of bars.
- 13 4. Finishing: Allow surfaces of lifts that are to remain exposed to become firm and then finish to
- 14 asurface matching adjacent concrete as approved by mock-up.
- 15 5. Curing: Wet-cure cementitious patching materials, including polymer-modified cementitious
- 16 patching materials, for not less than seven days by water-fog spray or water-saturated absorptive
- 17 cover.
- 18 D. Concrete: Place according to Section 03 30 00 "Cast-in-Place Concrete" and as follows:
- 19 1. Pretreatment: Apply epoxy bonding agent to reinforcement and concrete substrate.
- 20 2. Standard Placement:
- 21 a. At unformed surfaces, screed concrete to produce a surface that when finished with
- 22 patching mortar will match required profile and surrounding concrete.
- 23 3. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces
- 24 continuously wet by water-fog spray or water-saturated absorptive cover.

25

END OF SECTION

SECTION 03 10 00
CONCRETE FORMWORK

- 1
- 2
- 3 PART 1 – GENERAL
- 4 1.1 SECTION INCLUDES
- 5 1.2 RELATED WORK
- 6 1.3 REFERENCES
- 7 1.4 DESIGN REQUIREMENTS
- 8 1.5 SUBMITTALS
- 9 PART 2 – PRODUCTS
- 10 2.1 MATERIALS AND ACCESSORIES
- 11 2.2 FORM FINISHES
- 12 2.3 FABRICATION AND MANUFACTURE
- 13 PART 3 – EXECUTION
- 14 3.1 CONSTRUCTION OF TEMPORARY FORMWORK
- 15 3.2 COORDINATION
- 16 3.3 INSTALLATION OF EMBEDDED ITEMS
- 17 3.4 TOLERANCES
- 18 3.5 REMOVAL OF FORMS
- 19 3.6 REMOVING AND REUSING FORMS

20 **PART 1 - GENERAL**

21 **1.1 SECTION INCLUDES**

- 22 A. Design, construction and treatment of formwork and related accessories to confine and shape
- 23 concrete to the required dimensions.
- 24 B. Installation of embedded items such as waterstops, flashing reglets, shelf angles, and PVC weeps.
- 25 C. Structural notes indicated on the drawings regarding concrete formwork shall be considered a part
- 26 of this specification.

27 **1.2 RELATED WORK**

- 28 A. Pertinent Sections of Division 01.
- 29 B. Section 03 20 00 - Concrete Reinforcement.
- 30 C. Section 03 30 00 - Cast-in-Place Concrete.

31 **1.3 REFERENCES**

- 32 A. Codes and Standards: Comply with the provisions of the following codes, specifications, and
- 33 standards except where more stringent requirements are shown or specified. Where provisions of
- 34 the pertinent codes and standards conflict with this specification, the more stringent provision shall
- 35 govern.
- 36 1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.
- 37 2. ACI 301 - Specifications for Structural Concrete.
- 38 3. ACI 318 - Building Code Requirements for Structural Concrete.
- 39 4. ACI 347 - Guide to Formwork for Concrete.
- 40 5. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the
- 41 Field.
- 42 6. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete
- 43 Specimens.
- 44 7. NIST - PS 1: Structural Plywood

1 **1.4 DESIGN REQUIREMENTS**

- 2 A. Design and engineering of formwork is the responsibility of the Contractor. Design, engineer and
3 construct formwork, shoring, and bracing to conform to Contract Documents and in accordance with
4 building code requirements. Design for construction loads, lateral pressure, and requirements of the
5 applicable building code to conform to the required shape, line and dimensions.
- 6 B. Foundation concrete may be placed directly into neat excavations, provided the foundation trench
7 walls are stable as determined by the Geotechnical Engineer. In such case, the minimum formwork
8 indicated on the drawings is mandatory to ensure clean excavations immediately prior to and during
9 the placing of concrete.
- 10 1. When forms are omitted, provide additional 1" concrete minimum on each side of the
11 minimum design profiles and dimensions shown on the drawings.
- 12 C. Drawings show the design requirements and dimensions for structural strength, but structural
13 drawings do not show all detail dimensions to fit intricate architectural and mechanical detail.
14 Contractor shall so construct the concrete work that it will conform to the clearance required by the
15 architectural, mechanical and electrical design.
- 16 D. Maximum deflection of facing materials forming concrete surfaces exposed to view shall be 1/240 of
17 the center-to-center span between structural members of the formwork.
- 18 E. Carry vertical and lateral loads to ground by formwork system and in-place construction that has
19 attained adequate strength for that purpose. Where adequate foundations for shores and struts
20 cannot be secured, provide trussed supports.

21 **1.5 SUBMITTALS**

- 22 A. Product Data: Submit manufacturer's product data, installation instructions and specifications for
23 each of the following:
- 24 1. Waterstop profiles
25 2. Form sealer
26 3. Form release agent(s), including certification that agent is compatible with finish
- 27 B. Testing for Formwork Removal: When methods other than cylinder tests are proposed for
28 determining time for formwork removal, submit data on methods for approval.

29 **PART 2 - PRODUCTS**

30 **2.1 MATERIALS AND ACCESSORIES**

- 31 A. Formwork Accessories: Use commercially manufactured accessories for formwork accessories that
32 are partially or completely embedded in concrete, including ties and hangers.
- 33 B. Sealer: Clear, penetrating, synthetic resin sealer.
- 34 C. Formwork Release Agent: Use commercially manufactured form release agents that will prevent
35 formwork absorption of moisture, prevent bond with concrete, and will not stain the concrete surface.
36 Reapply to cleaned forms before each reuse. Formwork release agent shall be compatible with paint
37 or any other finish applied to the concrete; submit data indicating compatibility.
- 38 D. Waterstops: Waterstops shall be a flexible butyl rubber and bentonite clay compound that swells
39 upon contact with water. Acceptable manufacturers and products:
- 40 1. CETCO – Waterstop RX
41 2. Greenstreak – Swellstop
42 3. J.P. Specialties – Earth Shield (Type 20 & 23) Waterstop

- 1 E. Form Material:
- 2 1. No aluminum shall be allowed in the concrete work unless coated to prevent aluminum-
3 concrete reaction.
- 4 2. Concrete form materials must be used in a manner to provide the surface finish specified.
- 5 3. Design formwork in accordance with the provisions of the building code or the following
6 standards if not covered in the building code:
- 7 a. Wood - AF & PA "National Design Specification".
8 b. Plywood - American Plywood Association "Plywood Design Specification".
9 c. Steel - AISC "Manual of Steel Construction - Allowable Stress Design".
10 d. Aluminum - Aluminum Association "Aluminum Construction Manual".
11 e. Concrete - ACI 318.
12 f. Other materials - as directed by manufacturer.

13 **2.2 FORM FINISHES**

- 14 A. Rough Form Finish:
- 15 1. Concrete surfaces not exposed to view in the finished work shall have a rough-form finish.
16 No form-facing material is specified for rough-form finish.
- 17 2. Set and maintain forms so finished concrete dimensions shall conform to the tolerances.
18 Rough form finish is Designated Surface Finish-1.0 from ACI 301, except that surface
19 tolerance Class C is required as specified in ACI 117.
- 20 B. Smooth Form Finish:
- 21 1. Concrete surfaces exposed to view in the finished work or surfaces to receive finishes of
22 any type (paint, textured paint, etc.) shall have a smooth form finish. Form-facing material
23 shall be plywood, tempered concrete-form-grade hardboard, metal, plastic, paper, or other
24 acceptable material capable of producing the desired finish. Form-facing material shall
25 produce a smooth, uniform texture on the concrete. Do not use form facing material with
26 raised grain, torn surfaces, worn edges, patches, dents, or other defects that might impair
27 the texture of the concrete surfaces.
- 28 2. Set and maintain forms so finished concrete dimensions shall conform to the tolerances.
29 Smooth form finish is Designated Surface Finish-3.0 from ACI 301, including surface
30 tolerance Class A as specified in ACI 117.
- 31 C. Patching and repairing concrete finishes are specified under Section 03 30 00.

32 **2.3 FABRICATION AND MANUFACTURE**

- 33 A. Form Ties and Spreaders: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced
34 plastic form ties designed to resist lateral pressure of fresh concrete on forms, hold inner and outer
35 forms for vertical concrete together, and to prevent spalling of concrete on removal.
- 36 1. Furnish units that will leave no corrodible metal closer than 1-1/2 inch to the plane of the
37 exposed concrete surface.
- 38 2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in
39 concrete surface.
- 40 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or
41 waterproofing.
- 42 4. At horizontal pour lines, locate ties not more than 6" below the pour lines. Tighten after
43 concrete has set and before the next pour is made.

- 1 5. For exposed concrete surfaces, provide form ties of removable type with permanent plugs
2 and a system approved by the Architect for fixing the plugs in place.
- 3 B. Waterstops: Fabricate pieces of premolded waterstop with a maximum practicable length to hold the
4 number of end joints to a minimum. Fabricate joints in waterstops in accordance with manufacturer's
5 recommendations.

6 **PART 3 - EXECUTION**

7 **3.1 CONSTRUCTION OF TEMPORARY FORMWORK**

- 8 A. In accordance with ACI 301, construct formwork:
- 9 1. Design, erect, shore, brace, and maintain formwork to support vertical, lateral, static, and
10 dynamic loads, and construction loads that might be applied, until concrete structure can
11 support such loads.
- 12 2. Obtain approval before framing openings in structural members that are not indicated on
13 the drawings.
- 14 B. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
- 15 1. Provide crush or wrecking plates where stripping may damage cast concrete surfaces.
- 16 2. Provide top forms for inclined surfaces where slope is too steep to place concrete with
17 bottom forms only.
- 18 3. Chamfer wood inserts for forming reglets, recesses, and the like to allow wood to swell
19 without spalling concrete and to ensure easy removal.
- 20 C. Falsework:
- 21 1. Provide positive means of adjustment (wedges or jacks) of shores and struts. Do not adjust
22 formwork after concrete has taken its initial set. Brace formwork securely against lateral
23 deflection and lateral instability.
- 24 2. Verify lines, levels, and centers before proceeding with formwork. Ensure that dimensions
25 agree with the drawings.
- 26 3. Fasten form wedges in place after final adjustment of forms and prior to concrete placement.
- 27 4. Anchor formwork to shores, supporting surfaces, or members to prevent upward or lateral
28 movement of the formwork system during concrete placement.
- 29 5. Securely brace and shore forms to prevent displacement and to safely support construction
30 loads.
- 31 6. Construct forms plumb and straight to conform to slopes, lines, and dimensions shown.
- 32 7. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required
33 elevations and slopes in finished concrete surfaces. Provide and secure units to support
34 screed strips; use strike-off templates or compacting-type screeds.
- 35 8. Provide runways for moving equipment and support runways directly on formwork or
36 structural member without resting on the reinforcing steel.
- 37 D. Where end-of-work sequence requires a joint in the concrete, provide adequately designed additional
38 formwork. Extend reinforcement through formwork as indicated on the drawings. Location of the
39 construction joint is subject to approval by the Architect and the SEOR.

- 1 E. Forms for Exposed Concrete:
- 2 1. At construction joints, lap contact surface of the form sheathing for flush surfaces exposed
3 to view over the hardened concrete in the previous placement by not more than 1 inch.
4 Ensure formwork is held firmly against hardened concrete to prevent offsets or loss of mortar
5 at construction joints and to maintain a true surface.
- 6 2. Provide watertight formwork when architectural exposed concrete is specified.
- 7 3. Unless specified in the Contract Documents, construct formwork so concrete surfaces
8 conform to tolerance limits. The class of surface for offset between adjacent pieces of
9 formwork facing material shall be Class C, unless specified otherwise.
- 10 4. Do not use metal cover plates for patching holes or defects in forms.
- 11 5. Provide sharp, clean corners at intersecting plans, without visible edges or offsets.
- 12 6. Fill all unwanted joint openings with specified joint filler and finish flush to match adjacent
13 form surfaces.
- 14 F. Construct formwork for wall openings to facilitate removal and to counteract swelling of wood
15 formwork. Keep wood forms wet as necessary to prevent shrinkage.
- 16 G. Do not use rust-stained steel form-facing material.
- 17 H. Provide temporary openings at the base of wall formwork and at other points where necessary to
18 facilitate cleaning and inspection.
- 19 I. Unless noted otherwise, all footings shall be centered under walls, piers or columns.
- 20 J. Provisions for Other Trades:
- 21 1. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for
22 support of adjoining work prior to concrete placement.
- 23 2. Position and support expansion joint material and other embedded items to prevent
24 displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with readily
25 removable material to prevent entry of concrete into voids.
- 26 K. Projecting corners of walls and piers shall be formed with a 3/4-inch chamfer, unless noted otherwise
27 on architectural drawings.
- 28 L. Cleaning:
- 29 1. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign material
30 before concrete is placed.
- 31 2. Cover surfaces of formwork with acceptable formwork release agent. Apply form release
32 agent before placing reinforcing steel and concrete according to manufacturer's written
33 instructions. Do not allow formwork release agent to puddle in forms. Do not allow formwork
34 release agent to contact reinforcing steel or hardened concrete against which fresh concrete
35 is to be placed. Do not apply form release agent to concrete surfaces receiving special
36 finishes or applied coverings affected by the agent.
- 37 3. Clean and inspect formwork immediately before concrete is placed.
- 38 M. Provide forms for concrete work adjacent to earth banks including sides of footings, except where
39 footing excavation is vertical rock cut.
- 40 N. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture
41 or crushing.

1 **3.2 COORDINATION**

- 2 A. Install all required pipe sleeves, cavities or slots. Notify appropriate trades in due time so that they
3 may furnish information and make necessary installations. Check sizes, location and alignment of all
4 openings, frames and other work, which are to be built-in including electrical boxes and conduit.
- 5 B. Layout the run of partitions and establish location of openings so that other trades may properly
6 locate their work.
- 7 C. Core drilling concrete is not permitted unless noted otherwise or approved in writing by the Architect.
8 Notify the Architect in advance of conditions not shown on the drawings.

9 **3.3 INSTALLATION OF EMBEDDED ITEMS**

- 10 A. Built-In Items:
- 11 1. Confirm with Architect that all materials to be embedded are suitable for embedment in
12 concrete.
- 13 2. Build in anchors, inserts, and other devices indicated or required for various portions of
14 work.
- 15 3. Build in sleeves, thimbles, and other items furnished or set in place by other trades.
- 16 4. Accurately position and support all embedded items prior to concrete placement. Secure
17 embedded items against displacement during concrete placement operations.
- 18 5. Fill voids with readily removable material to prevent entry of concrete into voids.
- 19 6. Mechanical and electrical shall provide and set required sleeves.
- 20 7. Coordinate setting of all embedded items.
- 21 B. Waterstops:
- 22 1. Locate waterstops in joints where indicated on the drawings.
- 23 2. Build in waterstops using longest unbroken lengths possible to hold the number of end
24 splices to a minimum.
- 25 3. Form splices and intersections strictly according to the manufacturer's instructions so that
26 waterstops are continuous and develop effective watertight joint.
- 27 4. Locate waterstops as shown on the drawings. In general, waterstops should be located just
28 behind outermost layer of reinforcing. Do not place waterstops closer than 2" from face of
29 concrete.

30 **3.4 TOLERANCES**

- 31 A. Construction formwork to maintain tolerances required by ACI 301 and ACI 117.

32 **3.5 REMOVAL OF FORMS**

- 33 A. When removal of formwork is based on concrete reaching a specified compressive strength, concrete
34 will be presumed to have reached this strength when either of the following requirements has been
35 met:
- 36 1. Test cylinders, molded and cured under the same conditions for moisture and temperature
37 as used for the concrete they represent, have reached the specified compressive strength.

1 2. Concrete has been cured in accordance with the specifications for the same length of time
2 as laboratory-cured cylinders, which have reached the specified strength. Determine the
3 length of time concrete has been cured in the structure by the cumulative number of days
4 or fractions thereof, not necessarily consecutive, during which the temperature of the air in
5 contact with the concrete is above 50°F and the concrete has been damp or thoroughly
6 sealed from evaporation and loss of moisture.

7 B. Forms shall remain in place for the following periods of time. These periods represent cumulative
8 number days or hours, not necessarily consecutive, during which the temperature of the air
9 surrounding the concrete is above 50°F:

10 1. Walls and Footings: 67% specified compressive strength or minimum 24 hours.

11 C. When finishing is required, remove forms as soon as removal operations will not damage concrete.

12 D. Loosen wood formwork for wall openings when this can be accomplished without causing damage
13 to concrete.

14 E. Do not allow removal of formwork to damage the fresh concrete for columns, walls, sides of beams,
15 and other parts supporting the weight of the concrete. Perform needed repair and treatment required
16 on vertical surfaces at once and follow immediately with specified curing.

17 **3.6 REMOVING AND REUSING FORMS**

18 A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise
19 damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release
20 agent.

21 B. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align
22 and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless
23 approved by Architect.

24 **END OF SECTION**

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SECTION 03 20 00
CONCRETE REINFORCEMENT

1
2
3 PART 1 – GENERAL
4 1.1 SECTION INCLUDES
5 1.2 RELATED WORK
6 1.3 REFERENCES
7 1.4 SUBMITTALS
8 1.5 COORDINATION
9 1.6 DELIVERY STORAGE AND HANDLING
10 PART 2 – PRODUCTS
11 2.1 MATERIALS
12 2.2 FABRICATION
13 PART 3 – EXECUTION
14 3.1 PLACING

15 PART 1 - GENERAL

16 1.1 SECTION INCLUDES

- 17 A. Fabrication and placement of reinforcing steel for concrete, and all related accessories.
18 B. Reinforcing steel for use in bond beams, masonry columns, and lintels is specified in Division 4 and
19 is not a part of the work in this section.
20 C. Structural notes indicated on the drawings regarding concrete reinforcement shall be considered a
21 part of this specification.

22 1.2 RELATED WORK

- 23 A. Pertinent Sections of Division 01.
24 B. Section 03 10 00 - Concrete Formwork.
25 C. Section 03 30 00 - Cast-in-Place Concrete.

26 1.3 REFERENCES

- 27 A. Codes and Standards: Comply with the provisions of the following codes, specifications and
28 standards, except where more stringent requirements are shown or specified. Where provisions of
29 other pertinent codes and standards conflict with this specification, the more stringent provision shall
30 govern.
31 1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.
32 2. ACI 301 - Specifications for Structural Concrete.
33 3. ACI 318 - Building Code Requirements for Structural Concrete.
34 4. ACI SP-066 - ACI Detailing Manual.
35 5. ASTM A184 - Standard Specification for Welded Deformed Steel Bar Mats for Concrete
36 Reinforcement.
37 6. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for
38 Concrete Reinforcement.
39 7. ASTM A706 - Standard Specification for Deformed and Plain Low-Allow Steel Bars for
40 Concrete Reinforcement.
41 8. ASTM A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire
42 Reinforcement, Plain and Deformed, for Concrete.
43 9. Concrete Reinforcing Steel Institute (CRSI) - Manual of Standard Practice.

1 **1.4 SUBMITTALS**

- 2 A. Placing Drawings: Submit placing drawings showing fabrication dimensions and locations for
3 placement of reinforcement and reinforcement accessories. Indicate bar sizes, spacing, locations,
4 and quantities of reinforcing steel, bending and cutting diagrams, anchors, and supporting and
5 spacing devices. Dowels shall be shown in placing drawings for the element that is to be placed first.
6 Reinforcing steel descriptions or shop drawings shall be inch-pound sizes.
- 7 B. Manufacturer's Certifications:
- 8 1. Submit mill certifications at time of delivery.
9 2. Submit carbon equivalent (CE) for reinforcing bars to be welded.
- 10 C. Splices: Submit request for splices not indicated in the Contract Documents. Request shall indicate
11 locations, types, and lengths of splices for approval.
- 12 D. Field Bending: Submit requests and procedure for field bending or straightening of reinforcement
13 partially embedded in concrete not described in the Contract Documents.
- 14 E. Reinforcement Relocation: Submit requests to adjust reinforcement spacing necessitated by conflicts
15 with other reinforcement, conduits, etc. for approval.

16 **1.5 COORDINATION**

- 17 A. Coordinate reinforcement installation with the placement of formwork and other embedded items
18 such as inserts, conduit, pipe sleeves, drains, metal supports, anchor rods, etc.

19 **1.6 DELIVERY, STORAGE AND HANDLING**

- 20 A. Deliver reinforcement to the jobsite in bundles sorted and labeled with durable tags indicating bar
21 size, length, and shop drawing mark. Bundles shall also bear testing laboratory tags indicating
22 identified steel.
- 23 B. Store elevated clear of ground and protect at all times from contamination and deterioration.
- 24 C. Prevent bending, coating with earth, oil, or other material, or otherwise damaging the reinforcement.
- 25 D. Store welding electrodes in accordance with the requirements of AWS D1.4.

26 **PART 2 - PRODUCTS**

27 **2.1 MATERIALS**

- 28 A. Bar Deformations: Bars used for reinforcement shall be deformed except column spirals and welded
29 wire reinforcement, which may be plain.
- 30 B. Reinforcing Steel: Reinforcing steel shall conform to the ASTM standard and grade indicated in the
31 General Notes on the drawings.
- 32 C. Welded Wire Reinforcement: Welded wire reinforcement shall conform to the ASTM standard
33 indicated in the General Notes on the drawings.
- 34 D. Joint Dowel Bars: Plain-steel bars. Cut bars true to length with square ends and free of burrs.
- 35 E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening
36 reinforcing bars and welded wire reinforcement in place. Manufacture bar supports according to
37 CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced
38 concrete of greater compressive strength than concrete, and as follows:

- 1 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use
2 CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
- 3 2. Concrete cast against earth: Bars may be supported by precast concrete bricks or approved
4 prefabricated wire bar supports complying with CRSI recommendations with footpads large
5 enough to support the weight of the bars and construction traffic without being pushed into
6 underlying grade. Precast concrete blocks shall have a minimum compressive strength of
7 6,000 psi.

8 **2.2 FABRICATION**

- 9 A. Fabrication Tolerances: Reinforcing steel shall be shop fabricated within tolerances according to ACI
10 117 and other applicable codes, and shall conform in size, shape, quantity, dimensions, etc. to the
11 construction drawings and approved shop drawings.
- 12 B. Bar Condition: Bars shall be free from mill scale, excessive rust and other coatings, which would
13 reduce or destroy the bond with the concrete. Wipe oil from forms before reinforcement is placed on
14 or adjacent to so that oil will not be tracked over or in any way come into contact with the
15 reinforcement.
- 16 C. Bars Bending: Bars shall be bent cold, and no method of fabrication shall be used which would be
17 injurious to the material. Heating of bars for bending is not permitted.
- 18 D. Identification: After fabrication, bars shall be sorted, bundled and tagged with metal tags bearing the
19 bar mark before delivery to the jobsite.
- 20 E. Corner Bars: Provide corner bars to make reinforcing continuous at all times, including intersections
21 at footings, walls, or caps. Such bars shall be the same size and spacing as the horizontal reinforcing
22 and each leg shall have a length of at least 30 inches.
- 23 F. Reinforcing for continuous footings shall extend into spread footings a minimum of 2'-0".
- 24 G. Dowels between footings and walls or piers shall be the same grade, size and spacing or number as
25 the vertical reinforcing respectively, unless noted otherwise.

26 **PART 3 - EXECUTION**

27 **3.1 PLACING**

- 28 A. Reinforcement Relocation: When necessary to move reinforcement beyond the specified spacing to
29 avoid interference with other reinforcement, or embedded items, submit resulting arrangement of
30 reinforcement to SEOR for approval.
- 31 B. Reinforcement Cutting: Cutting of reinforcement which conflicts with embedded objects is not
32 acceptable.
- 33 C. Welded Wire Reinforcement: Extend welded wire reinforcement to within 1 inch of the concrete edge.
34 Lap edges and ends of fabric sheets a minimum of two full mesh squares. Lace edges with 16-gauge
35 tie wire. Support welded wire reinforcement during placing of concrete to assure required positioning
36 in the slab. Do not place wire reinforcement on grade or metal deck and raise into position in freshly-
37 placed concrete.
- 38 D. Wire Tie Orientation: Set wire ties so that ends are directed away from concrete surface.
- 39 E. Slab on Grade Reinforcement Placement: Place shrinkage and temperature reinforcement 2 inches
40 from the top surface of the slabs on grade unless noted otherwise on the drawings.
- 41 F. Do not cut, displace, or puncture vapor retarder. Repair damage and reseal vapor retarder before
42 placing concrete.

- 1 G. Support for Reinforcement: Unless noted otherwise, supports for reinforcement shall have Class 2
2 protection as defined in the CRSI Manual of Standard Practice. Submit data on supports indicating
3 class of protection at all different locations for approval. Supports shall not be used as bases for
4 runways for concrete-conveying equipment and similar construction loads. Do not place reinforcing
5 bars more than 2" beyond last leg of any continuous bar support.
- 6 H. Support for Bars in Concrete Cast on Ground: Bar supports for slabs on grade, footings, and all other
7 concrete cast directly onto grade shall be supported at an average spacing of 4 feet or less in each
8 direction.
- 9 I. Securing Reinforcing Bars: All bars must be placed, spaced, secured and supported prior to casting
10 concrete. Bars embedded in hardened or partially hardened concrete shall not be bent unless
11 approved in writing prior to placement by the SEOR.
- 12 J. Foot Traffic: Restrict foot traffic over the slab on grade reinforcing after it has been properly
13 positioned.
- 14 K. Reinforcement at Expansion Joints: Do not continue reinforcement or other embedded metal items
15 bonded to concrete through expansion joints. Dowels bonded on only one side of a joint and
16 waterstops may extend through joint.
- 17 L. Pumping Concrete: When using a pump to place concrete, pump hose shall be supported directly on
18 forms. Do not allow hose to rest on reinforcing bars if doing so could cause displacement of bars.
- 19 **END OF SECTION**

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

- 1
- 2
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- 28 3.12 COLD WEATHER CONCRETING
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- 30 3.14 FIELD QUALITY ASSURANCE
- 31 3.15 REPAIR OF DEFECTIVE AREAS
- 32 3.16 CEMENT GROUT AND DRY-PACK
- 33 3.17 CLEANING

34 PART 1 - GENERAL

35 1.1 SECTION INCLUDES

- 36 A. All items required for executing and completing the cast-in-place concrete work and related work
- 37 shown on the drawings or specified herein. Work shall include installation of items furnished in other
- 38 sections of these specifications.

- 39 B. Concrete paving, walks, and curbs are specified in Division 3 or 32.

- 40 C. Structural notes indicated on the drawings regarding cast-in-place concrete shall be considered a
- 41 part of this specification.

42 1.2 RELATED WORK

- 43 A. Pertinent Sections of Division 01.
- 44 B. Section 03 10 00 - Concrete Formwork.
- 45 C. Section 03 20 00 - Concrete Reinforcement.
- 46 D. Section 05 31 00 - Steel Deck.

1 **1.3 REFERENCES**

2 A. Codes and Standards: Comply with the provisions of the following codes, specifications, and
3 standards, except where more stringent requirements are shown or specified. Where any provision
4 of other pertinent codes and standards conflict with this specification, the more stringent provision
5 shall govern.

- 6 1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.
- 7 2. ACI 301 - Specifications for Structural Concrete.
- 8 3. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
- 9 4. ACI 302.2R - Guide for Concrete Slabs that Received Moisture-Sensitive Flooring Materials.
- 10 5. ACI 304R - Guide to Measuring, Mixing, Transporting, and Placing Concrete.
- 11 6. ACI 305.1 - Specification for Hot Weather Concreting.
- 12 7. ACI 306.1 - Guide to Cold Weather Concreting.
- 13 8. ACI 308R - Guide to External Curing of Concrete.
- 14 9. ACI 309R - Guide for Consolidation of Concrete.
- 15 10. ACI 318 - Building Code Requirements for Structural Concrete.
- 16 11. ACI 347R - Guide to Formwork for Concrete.
- 17 12. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the
18 Field.
- 19 13. ASTM C33 - Standard Specification for Concrete Aggregates.
- 20 14. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete
21 Specimens.
- 22 15. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed
23 Beams of Concrete.
- 24 16. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
- 25 17. ASTM C138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content
26 (Gravimetric) of Concrete.
- 27 18. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
- 28 19. ASTM C150 - Standard Specification for Portland Cement.
- 29 20. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement
30 Mortar and Concrete
- 31 21. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
- 32 22. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
- 33 23. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the
34 Volumetric Method.
- 35 24. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the
36 Pressure Method.
- 37 25. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- 38 26. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing
39 Concrete.
- 40 27. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
- 41 28. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural
42 Pozzolan for Use in Concrete.
- 43 29. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing
44 Flowing Concrete.
- 45 30. ASTM C1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened
46 Concrete.
- 47 31. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic Cement
48 Concrete.
- 49 32. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates
50 for Use in Construction and Criteria for Testing Agency Evaluation.
- 51 33. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout
52 (Nonshrink).
- 53 34. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete
54 Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- 55 35. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.
- 56 36. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth
57 Under Concrete Slabs, on Walls, or as Ground Cover.
- 58 37. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection,
59 Testing, or Inspection.

- 1 38. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact
2 with Soil or Granular Fill under Concrete Slabs.
3 39. Concrete Reinforcing Steel Institute (CRSI) - Manual of Standard Practice.

4 **1.4 TESTING AND INSPECTION**

5 A. Inspection and Testing:

6 1. The Owner shall employ an Inspection Agency to perform the duties and responsibilities
7 specified below.

8 2. Refer to architectural, civil, mechanical, and electrical specifications for testing and
9 inspection requirements of non-structural components.

10 3. Work performed on the premises of a fabricator approved by the building official need not
11 be tested and inspected per the table below. The fabricator shall submit a certificate of
12 compliance that the work has been performed in accordance with the approved plans and
13 specification to the building official and the Architect and Engineer of Record.

14 4. Duties of the Inspection Agency:

15 a. Perform all testing and inspection required per the Testing and Inspection
16 Schedule indicated below.

17 b. Furnish inspection reports to the building official, the Owner, the Architect, the
18 Engineer of Record, and the General Contractor. The reports shall be completed
19 and furnished within 48 hours of inspected work.

20 c. Submit a final signed report stating whether the work requiring Inspection was, to
21 the best of the Inspection Agency's knowledge in conformance with the approved
22 plans and specifications.

23 5. Structural Component Testing and Inspection Schedule for Section 03 30 00 is as follows:

	Continuous	Periodic	Referenced Standard
Concrete and Concrete Placement			
Review of proposed mix design and supporting test results		X	
Inspect anchors cast in concrete		X	ACI 318: 17.8.2
Inspect anchors post-installed in hardened concrete members.			
A. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.	X		ACI 318: 17.8.2.4
B. Mechanical anchors and adhesive anchors not defined in row above.		X	ACI 318: 17.8.2
Verify use of required design mix		X	ACI 318: Ch. 19, 26.4.3, 26.4.4
Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X		ASTM C172, ASTM C31, ACI 318: 26.4, 26.12
Inspection of concrete placement for proper application techniques	X		ACI 318: 26.5
Verify maintenance of specified curing temperature and techniques.		X	ACI 318: 26.5.3-26.5.5
Verify in-situ concrete strength prior to removal of shores and forms from beams and structural slabs		X	ACI 318: 26.11.2

- 1 B. Sampling and testing requirements:
- 2 1. Maintain records verifying materials used are of the specified and accepted types and sizes
3 and are in conformance with the requirements of the Contract Documents.
- 4 2. Use of testing services will not relieve the Contractor of the responsibility to furnish materials
5 and construction in full compliance with the Contract Documents.
- 6 3. Take samples of fresh concrete at the job site for each mix design placed each day.
7 Sampling and testing shall be done after the final addition and proper mixing of any water
8 or admixtures that are added on site.
- 9 a. Personnel and testing equipment shall meet the requirements of ASTM E329.
- 10 b. Testing Frequency: Obtain at least one composite sample for each 150 cu. yd. or
11 5,000 sq. ft. of surface area, whichever is less or fraction thereof of each concrete
12 mixture placed each day.
- 13 1) On a given project, if the total volume of concrete is such that the
14 frequency of testing required above would provide less than five strength
15 tests for a given class of concrete, tests shall be made from at least five
16 randomly selected batches or from each batch if fewer than five batches
17 are used.
- 18 c. A strength test shall be the average of the strengths of two 6x12 inch or three 4x8
19 inch cylinders made from the same sample of concrete and tested at 28 days.
- 20 4. For each sample of fresh concrete, perform the following duties:
- 21 a. Measure and record slump in accordance with ASTM C143.
- 22 b. Measure and record temperature in accordance with ASTM C1064.
- 23 1) Provide one test hourly when air temperature is 40°F and below and when
24 80°F and above, and one test for each composite sample.
- 25 c. Measure and record air content by volume in accordance with either ASTM C231
26 or ASTM C173.
- 27 d. Mold three 6x12 inch or four 4x8 inch cylinders (laboratory cylinders) in accordance
28 with ASTM C31 to be laboratory-cured. Protect from moisture loss and maintain at
29 60°F to 80°F for 24 to 48 hours before moving. Deliver cylinders to testing
30 laboratory for curing and testing.
- 31 e. Mold one cylinder (field cylinder) in accordance with ASTM C31 to be field-cured.
32 Field cylinder shall be placed as near as possible to the in-place concrete from
33 which it was taken, protected, and cured in the same manner. Deliver field-cured
34 cylinder to testing laboratory, and measure and record compressive strength in
35 accordance with ASTM C39. Field cylinder shall be used to determine if concrete
36 footings, walls, or piers have reached the required compressive strength for steel
37 erection to begin.
- 38 5. Measure and record compressive strength in accordance with ASTM C39 for laboratory
39 cylinders. Test one laboratory cylinder at 7 days and all other cylinders at 28 days.
40 Acceptance is based on the average of the two 6x12 inch or three 4x8 inch laboratory cured
41 28-day tests. Notify Architect in the event strength levels do not meet the acceptance
42 requirements of ACI 318.
- 43 a. Any additional cylinders molded for Contractor to have a compressive strength test
44 done before seven days shall be at the Contractor's expense.

- 1 6. Prepare and submit test reports to the Architect, Engineer, Contractor, and Supplier.
2 Reports shall be completed and furnished within 48 hours of testing. Refer to description in
3 Submittals.
- 4 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-
5 cured cylinders, Contractor shall evaluate operations and provide corrective procedures for
6 protecting and curing in-place concrete.
- 7 8. Should the strength of any grade of concrete for any portion of work, as indicated by molded
8 test cylinders, fall below the minimum 28-day compressive strength specified on the
9 drawings, upon approval of the Structural Engineer of Record (SEOR), the concrete supplier
10 shall adjust the concrete mix for remaining portion of construction so that the resulting
11 concrete meets the minimum strength requirements.

12 **1.5 SUBMITTALS**

- 13 A. Concrete Materials: Submit information on concrete materials as listed below.
- 14 1. Cementitious materials: Submit type, class, producer name, and certification not more than
15 90 days old of compliance with applicable ASTM standard.
- 16 2. Aggregates: Submit type, pit or quarry location, producer name, gradations, specific gravity,
17 water content, and certification not more than 90 days old.
- 18 3. Admixtures: Submit product data sheet. Product data shall include: dosages and
19 performance data, brand names, producers, chloride ion concentrations, and certifications
20 of compliance with applicable ASTM standard. Certifications shall not be more than 90 days
21 old.
- 22 4. Water: Submit name of source.
- 23 B. Product Data: Prepare and submit product and performance data for materials and accessories,
24 including patching compounds, joint systems, curing compounds, finish materials and other concrete
25 related items.
- 26 C. Testing Agency Qualifications: When requested, the proposed testing agencies shall submit data on
27 qualifications for acceptance.
- 28 D. Concrete Mix Design:
- 29 1. Concrete mix design submittals shall be submitted to the SEOR for review and approval at
30 least 14 days prior to placing concrete.
- 31 2. Submit concrete mixture proportions and characteristics for each concrete mix. Include
32 standard deviation analysis or trial batch data with mix design. Submit historical field test
33 data to demonstrate the average compressive strength for approval. Concrete mix
34 proportions, materials, and handling methods for field test data or trial batches shall be the
35 same as used for the work. Include the following information for each mix design:
- 36 a. Water/cementitious materials ratio.
37 b. Slump per ASTM C143
38 c. Air content per ASTM C231 or ASTM C173
39 d. Unit weight of concrete per ASTM C138
40 e. Compressive strength at 28 days per ASTM C39
- 41 3. If trial batches are used, submit representative samples of each proposed ingredient to
42 independent testing laboratory for use in preparation of mix design.
- 43 4. Include alternate mix designs when characteristics of materials, project conditions, weather,
44 test results, or other circumstances warrant adjustments. Indicate amounts of mix water to
45 be withheld for later addition at Project site.

- 1 5. Provide a record copy of the final mix designs and test results to the testing agency prior to
2 commencement of the concrete work.
- 3 E. Test Reports: Submit laboratory test reports for concrete materials, mix design, compressive
4 strength, slump, air content, and temperature. Each report shall indicate date of sampling, date of
5 test, mix design, and location of concrete in structure.
- 6 F. Repair Methods: When stains, rust, efflorescence, and surface deposits must be removed, submit
7 the proposed method of removal.
- 8 G. Certificates: Submit written certification regarding the design mix from the ready-mix supplier and the
9 admixture manufacturer stating all concrete and admixtures do not contain chloride ions in excess of
10 concentrations specified herein.
- 11 H. Placement Notification: Notify the Architect at least 24 hours in advance of concrete placement.
- 12 I. Adjustments: Submit any adjustments to mixture proportions or changes in materials, suppliers, or
13 sources, along with supporting documentation, during the course of the work.
- 14 J. Cold Weather Procedure Submittal: Refer to Cold Weather Concreting article in Part 3 for more
15 information.
- 16 K. Record Documents: Accurately record actual locations of embedded utilities and components that
17 are concealed from view.

18 **1.6 DELIVERY, STORAGE, AND HANDLING**

- 19 A. Cementitious materials: Store cementitious materials in dry weather tight buildings, bins, or silos that
20 exclude contaminants.
- 21 B. Aggregates: Store and handle aggregate in a manner that will avoid segregation and prevent
22 contamination with other materials or other sizes of aggregates. Store aggregates so as to drain
23 freely.
- 24 C. Admixtures: Protect stored admixtures against contamination, evaporation, or damage. Protect liquid
25 admixtures from freezing and temperature changes, which would adversely affect their performance.
26 Handle chemical admixtures in accordance with manufacturer's instructions.

27 **PART 2 - PRODUCTS**

28 **2.1 CONCRETE MATERIALS**

- 29 A. Portland Cement: Portland cement shall conform to ASTM C150, Type I Normal, and be a standard
30 brand of Portland cement. Use one brand of cement throughout project, unless approved in writing
31 by the Engineer. Cement, which conforms to ASTM C150 Type II, may be used if it also meets the
32 requirements of ASTM C150 Type I. Cement used in concrete shall be of the same brand and type
33 as the cement used in the concrete represented by the submitted field test data or used in the trial
34 mixtures. Maintain consistent cement color throughout project unless directed otherwise by
35 architectural requirements.
- 36 1. Total replacement of Portland cement by supplementary cementitious materials in design
37 mixture shall not exceed 50% (by weight).
- 38 B. Supplementary Cementitious Materials
- 39 1. Fly Ash: Fly ash shall conform to ASTM C618, Class C or Class F. Replacement of Portland
40 cement by fly ash shall not exceed the following (percentages are by weight):
- 41 a. Concrete Flatwork: 20 percent.
42 b. Mass Concrete (more than two feet thick): 50 percent.

- 1 c. All other concrete: 25 percent.
 2 d. Concrete to be placed in cold weather as defined herein: No fly ash allowed unless
 3 the cold weather procedure submitted has compensated for the increased setting
 4 time and decreased rate of strength gain due to cold weather and fly ash.
- 5 2. Slag Cement: ASTM C989, Grade 100 or 120.
- 6 a. Ground Granulated Blast-Furnace Slag Limit: 50% by weight of total cementitious
 7 materials.
- 8 b. In mass concrete more than 2 feet thick, the usage rate may be 80% by weight of
 9 total cementitious materials.
- 10 3. Combined Fly Ash and Ground Granulated Blast-Furnace Slag:
- 11 a. Supplementary Cementitious Materials Limit: 50% with fly ash not exceeding 25%
 12 by weight of total cementitious materials.
- 13 b. In mass concrete more than 2 feet thick: 80% with fly ash not exceeding 50% by
 14 weight of total cementitious materials.
- 15 C. Coarse Aggregate for Normal Weight Concrete: Comply with ASTM C33. Provide coarse aggregate
 16 from a single source for exposed concrete. Gradations shall be similar to that described in the
 17 following table:

COARSE AGGREGATE GRADATIONS							
SIEVE SIZE - PERCENT PASSING							
Grade No.	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 16
4	90-100 Note 1	20-55	0-15	---	0-5		---
57	100	95-100	---	25-60	0-10	0-10	---
67		100	90-100	---	20-55	0-10	---
89	---	---	---	100	90-100	20-55	0-10

- 18 1. Shall be 100 percent passing the 2" sieve.
- 19 D. Fine Aggregate for Normal Weight Concrete: Comply with ASTM C33. Provide fine aggregate from
 20 a single source for exposed concrete. Fine aggregate shall consist of washed sand. Gradations shall
 21 be similar to that described in the following table:

FINE AGGREGATE GRADATIONS							
SIEVE SIZE - PERCENT PASSING							
Grade No.	3/8	No. 4	No. 8	No. 16	No. 50	No. 80	No. 100
FA	100	95-100	80-100	50-85	5-30	---	0-10

- 22 E. Do not use aggregates containing deleterious substances that could cause spalling on any exterior
 23 exposed surface. These include, but are not limited to the following:
- 24 1. Organic impurities.
 25 2. Ferrous metals.
 26 3. Soluble salts.

- 1 4. Coal, lignite, or other lightweight materials.
2 5. Soft particles.
3 6. Clay lumps and friable particles.
4 7. Cherts of less than 2.40 specific gravity.
- 5 F. Water: Mixing water for concrete shall meet the requirements of ASTM C94. Water shall be clean
6 and free from injurious amounts of acids, alkalis, organic materials, chloride ions and oils deleterious
7 to concrete or reinforcing steel.
- 8 G. Testing agency shall be given access to plants and stockpiles to obtain samples for testing for
9 compliance with the Contract Documents.
- 10 **2.2 ADMIXTURES**
- 11 A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other
12 admixtures. Calcium chloride thiocyanates or admixtures containing intentionally added chlorides are
13 not permitted.
- 14 B. Water Reducing Admixture: Material shall comply with ASTM C494, Type A. Acceptable
15 manufacturers and products include:
- 16 1. BASF Corporation - MasterPozzolith Series or MasterPolyheed Series.
17 2. Euclid Chemical Company - Eucon WR Series.
18 3. Sika Chemical Corp. - Plastocrete 161.
19 4. GRT – Polychem 400 NC.
20 5. Grace Construction Products - WRDA 82.
- 21 C. High Range Water Reducing Admixture (superplasticizer): Material shall comply with ASTM C494,
22 Type F or Type G. Acceptable manufacturers and products include:
- 23 1. BASF Corporation - MasterRheobuild 1000 or MasterGlenium Series.
24 2. Euclid Chemical Company - Eucon 37 or Plastol Series.
25 3. Sika – ViscoCrete 2100.
26 4. GRT – Melchem.
27 5. Grace Construction Products - Mira 110.
- 28 D. High Range Water Reducing, Slump Retaining Admixture: Material shall comply with ASTM C494,
29 Type F or Type G. Acceptable manufacturers and products include:
- 30 1. BASF Corporation - MasterGlenium 7700.
31 2. Euclid Chemical Company - Eucon 537, Eucon 1037, or Plastol Series.
32 3. Sika – Sikament 686.
33 4. GRT – Melchem – M.
34 5. Grace Construction Products – ADVA FLEX.
- 35 E. Non-Chloride Accelerator: Material shall comply with ASTM C494, Type C or Type E, and not contain
36 a higher chloride ion concentration than municipal drinking water. Acceptable manufacturers and
37 products include:
- 38 1. BASF Corporation - MasterSet FP 20 or MasterSet AC 534.
39 2. Euclid Chemical Company - Accelguard Series.
40 3. Sika Chemical Corp. - Sika Rapid-1.
41 4. GRT – Polychem HE.
42 5. Grace Construction Products – Lubricon NCA.
- 43 F. Air Entraining Admixture: Air entraining admixture shall comply with ASTM C260, and be certified by
44 the manufacturer to be compatible with other admixtures to be used. Acceptable manufacturers and
45 products include:
- 46 1. BASF Corporation - MasterAir Series.
47 2. Euclid Chemical Company - Air-Mix or AEA Series.

- 1 3. Sika Chemical Corporation - Sika-Aer.
- 2 4. GRT – Polychem VR.
- 3 5. Grace Construction Products - Darex II or Daravair 1000.

4 G. Admixtures used in concrete shall be the same brand, type, and dosage used in concrete represented
5 by field test data or used in trial mixes.

6 2.3 CURING PRODUCTS

7 1. Moisture Retaining Cover: Plastic Film: Use 6 mil polyethylene film sheet materials that
8 meet the requirements of ASTM C171.

9 2. White burlap-polyethylene sheet meeting ASTM C171.

10 3. Reinforced Curing Paper complying with ASTM C171.

11 4. Moisture Retaining Fabric: A naturally colored, non-woven, polypropylene fabric with a 4-
12 mil, non-perforated reflective (white) polyethylene coating containing stabilizers to resist
13 degradation from ultraviolet light. Fabric shall exhibit low permeability and high moisture
14 retention. Acceptable manufacturers and products include:

- 15 a. PNA Construction Technologies, Inc.: Hydracure S16.
- 16 b. PNA Construction Technologies, Inc.: Hydracure M5.
- 17 c. Reef Industries Incorporated: Transguard 4000.

18 B. Dissipating Resin Curing Compound: Clear, waterborne, membrane-forming curing compound
19 complying with ASTM C309, Type 1, Class B shall be composed of hydrocarbon resins and
20 dissipating agents that begin to break down upon exposure to ultraviolet light and traffic
21 approximately 4 to 6 weeks after application, providing a film that is removable with standard
22 degreasing agents, and mechanized scrubbing actions so as to not impair the later addition of applied
23 finishes.

24 1. Curing compounds used on interior enclosed environments shall be a water-borne product
25 and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

26 C. Non-dissipating Curing Compound: Clear, membrane-forming curing compound complying with
27 ASTM C309, Type 1, Class B.

28 1. Curing compounds used on interior enclosed environments shall be a water-borne product
29 and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

30 D. Curing and Sealing Compound: Clear, membrane-forming curing and sealing compound complying
31 with ASTM C309, Type 1, and ASTM C1315, Type 1, Class A. Compound shall dry to a clear finish,
32 resist yellowing due to ultraviolet degradation and provide a long-lasting finish that has high
33 resistance to chemicals, oil, grease, deicing salts, and abrasion.

34 1. Curing and sealing compounds used on interior enclosed environments shall be a water-
35 borne product and VOC compliant as required by the U.S. EPA Architectural Coating Rule.

36 2.4 MISCELLANEOUS MATERIALS

37 A. Patching Mortar: Non-shrink, non-slump, non-metallic, quick setting. Acceptable manufacturers and
38 products:

- 39 1. Euclid Chemical Company - Eucospeed.
- 40 2. BASF Corporation - MasterEmaco N 424.
- 41 3. Adhesive Technologies. - Hard Rok Vertipatch.
- 42 4. W.R. Meadows - Speed Crete (Red Line).
- 43 5. Dayton Superior – Re-Crete 20 minute.
- 44 6. SpecChem - Precast Patch.

- 1 B. Cement Grout: Mix 1 part Portland cement, 2-1/2 to 3 parts fine aggregate, and enough water for
2 required consistency. Depending on use, consistency may range from mortar consistency to a
3 mixture that will flow under its own weight. Do not mix more than the amount that can be used within
4 30 minutes. Retempering is not permitted. Use for leveling, preparing setting pads, beds, construction
5 joints (with liquid bonding admixture) and similar uses. Do not use for grouting under bearing plates
6 or structural members in place.
- 7 C. Dry-Pack: Mix 1 part Portland cement, 2 parts fine aggregate, and enough water to hydrate cement
8 and provide a mixture that can be molded with the hands into a stable ball (a stiff mix). Do not mix
9 more than the amount that can be used within 30 minutes.
- 10 D. Expansion Joint Material: Preformed, resilient, non-extruding asphalt-impregnated fiber conforming
11 to ASTM D1751. Thickness of expansion joint material shall be 1/2" unless noted otherwise on the
12 drawings.
- 13 E. Magnesium phosphate patching cement specially designed for cold weather grouting and anchoring.
14 Acceptable Manufacturer:
- 15 1. BASF Corporation - MasterEmaco T545.
16 2. Euclid Chemical Company - Eucospeed MP.
- 17 F. Vapor Retarder: ASTM E 1745, Class A, not less than 10 mils (0.25 mm) thick. Acceptable
18 manufacturers and products:
- 19 1. Stego Industries, LLC - Stego Wrap.
20 2. W.R. Meadows, Inc. - Perminator.
21 3. Raven Industries - Vapor Block
22 4. Insulation Solutions - Viper VaporCheck II.
- 23 G. Penetrating Liquid Floor Treatment: Chemically reactive, waterborne solution of inorganic silicate or
24 silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and
25 densifies concrete surfaces. Acceptable manufacturers and products:
- 26 1. BASF Corporation - MasterKure HD 200WB.
27 2. Conspec Marketing & Manufacturing Co., Inc. - Intraseal
28 3. Curecrete Chemical Co., Inc. - Ashford Formula
29 4. Dayton Superior Corporation - Day-Chem Sure Hard (J-17)
30 5. Euclid Chemical Company - Eucosil
31 6. L&M Construction Chemicals, Inc. - Seal Hard
32 7. Vexcon Chemicals, Inc - Vexcon Starseal PS
33 8. SpecChem - SpecHard
- 34 H. Control Joint Filler: Flexible, single-component polyurethane sealant with backer rod compliant with
35 ASTM C 920, Type S, Grade P, Class 25. Apply sealant per manufacturers written recommendations.
36 Acceptable manufacturers and products:
- 37 1. Dayton Superior – Perma 230 SL.
38 2. Euclid Chemical Company – Eucolastic I.
39 3. BASF Corporation - MasterSeal SL 1.

40 **2.5 STRENGTH AND PROPERTIES**

- 41 A. Concrete Mix Designs: Refer to drawings for specified compressive strength. Proportion concrete
42 mixes according to the properties in the following tables. The concrete supplier may produce a mix
43 at a lower water-cement ratio to allow for adjustment of slump at the site by adding water. The addition
44 of site water shall be in accordance with ASTM C94, and the total water-cement ratio shall not exceed
45 the value specified below.

Class	Coarse Aggregate Gradation	Fine Aggregate Gradation	Range of Slump	Max. w/c	Air Content	Other Requirements
A	57 or 67	FA	1" to 4"	0.40	5% to 8%	
B	57 or 67	FA	1" to 4"	0.45	5% to 8%	
C	57 or 67	FA	1" to 4"	0.50	—	
D	57 or 67	FA	4" to 6"	0.50	—	Use water reducing admixture to achieve slump specified
E	4 or 57	FA	1" to 4"	0.50	—	
F	4 or 57	FA	5" to 8"	0.50	—	Use retarder
G	89	FA	5" to 8"	0.50	—	
H	Lightweight	FA	5" max	0.5	4% to 7%	Maximum 107-116 pcf dry density

- 1 Note: w/c = water-cementitious materials ratio.
- 2 B. Schedule of Concrete Classes: Provide concrete of the specified class according to the following
- 3 schedule.
- 4 1. Footings: Class E
- 5 2. Exterior foundation walls and piers: Class B
- 6 3. Interior piers: Class C
- 7 4. Interior slabs on grade: Class D
- 8 5. Interior slab on metal decks: Class D
- 9 6. Unless noted otherwise: Class B
- 10 C. Slump of Superplasticized Concrete: Concrete containing high-range water reducing admixtures
- 11 (superplasticizer) shall have 8" maximum slump, unless otherwise approved by Structural Engineer.
- 12 D. Accelerators: Add non-chloride accelerator to all concrete slabs placed at air temperatures below
- 13 50°F only when approved in the mix design. Use of admixtures will not relax cold weather placement
- 14 requirements.
- 15 E. Water Reducer: Add water reducing admixture or high range water reducing admixtures
- 16 (superplasticizers) as follows:
- 17 1. All pumped concrete.
- 18 2. Fiber reinforced concrete.
- 19 3. As required for placement or workability.
- 20 4. As required by high temperatures, low humidity, or other adverse placement conditions.
- 21 5. Concrete with water-cementitious materials ratio below 0.50.
- 22 F. No other admixtures shall be used unless approved by SEOR.
- 23 G. Chlorides: Admixtures or other ingredients including aggregates containing calcium chloride or more
- 24 than 0.05% chloride ions by weight shall not be used.
- 25 H. Workability: Concrete shall have a workability such that it will fill the forms without voids,
- 26 honeycombs, or rock pockets with proper vibration without permitting materials to separate or excess
- 27 water to collect on the surface.

1 I. Concrete Temperatures: Minimum concrete temperature of fresh concrete varies in relation to
2 average air temperature over a 24-hour period as follows:

- | | | | |
|---|----|------------------------------|--------------------------------|
| 3 | 1. | Air temperature below 0°F | Concrete temperature 70°F min. |
| 4 | 2. | Air temperature 0°F to 30°F | Concrete temperature 65°F min. |
| 5 | 3. | Air temperature 30°F to 50°F | Concrete temperature 50°F min. |
| 6 | 4. | Air temperature above 50°F | No minimum temperature |

7 The maximum temperature of concrete at the time of delivery shall be 90°F. When concrete
8 temperature exceeds 90°F, concrete supplier shall attempt to reduce temperature by shading
9 aggregates and cement and cooling mix water. When these methods fail to reduce concrete
10 temperature below 90°F, supplier shall use ice in the water to reduce the concrete temperature. Use
11 set retarding admixtures only when approved in the mix design.

12 **PART 3 - EXECUTION**

13 **3.1 PREPARATION**

- 14 A. Verify requirements for concrete cover over reinforcement.
- 15 B. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are
16 accurately placed, positioned securely, and will not cause hardship in placing concrete.
- 17 C. Do not place concrete until data on materials and mix designs have been approved, Architect has
18 been notified, and all other affected trades have coordinated their work.
- 19 D. Remove snow, ice, frost, water, mud, and other foreign material from surfaces, reinforcing bars and
20 embedded items against which concrete will be placed.
- 21 E. Prepare previously placed concrete by cleaning with sandblasting, steel brush, or water blast to
22 expose aggregate to minimum 1/4" amplitude.
- 23 F. Sandblast all existing concrete surfaces older than 28 days against which concrete is to be placed,
24 unless directed otherwise in writing by Architect/Engineer.

25 **3.2 SLABS**

- 26 A. Slab on Grade:
- 27 1. All interior slabs on grades shall have a polyethylene vapor retarder conforming to ASTM
28 E1745. Lap all joints minimum 6" and seal edges with adhesive tape. Fit vapor retarder
29 around utilities and seal with adhesive tape as required. Place, protect, and repair vapor-
30 retarder sheets according to ASTM E 1643 and manufacturer's written instructions.
- 31 2. Refer to drawings and Section 31 23 00 for required sub-grade preparation beneath slabs
32 on grade.
- 33 3. Where vapor retarder is not used below slab on grade, wet sub-grade below slab prior to
34 placing concrete. Subgrade shall be moist with no free water and no muddy or soft spots.
- 35 4. Saw cut control joints: Cut with power saws equipped with shatterproof abrasive or
36 diamond-rimmed blades. Cut joints into concrete when cutting action will not tear, abrade,
37 or otherwise damage surface and before concrete develops random contraction cracks.
38 Control joints shall be located along column lines, with intermediate joints spaced at a
39 maximum distance of 36 times the slab thickness, unless noted otherwise. Control joints
40 shall be continuous, not staggered or offset. Slab panels shall have a maximum length to
41 width ratio of 1.5 to 1. Provide additional control joints at all reentrant or isolated corners
42 formed in the slab on grade. Refer to drawings for typical control joint detail.

- 1 5. Provide isolation joints around each column and along foundation walls. Form isolation
2 joints with 1/2" expansion joint material. Extend isolation joint material full width and
3 depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
- 4 6. Depress slabs as required for mats architectural finishes. Obtain layout and locations from
5 Architect.
- 6 7. Verify completion of all under slab work with mechanical and electrical trades before placing
7 slabs.
- 8 8. Slope slabs as indicated on drawings and to provide positive drainage. Slope slab keeping
9 bottom level and varying top. Maintain minimum thickness of concrete as indicated on
10 drawings. Refer to floor finishes for tolerances.
- 11 B. All supported slabs, including slabs-on-steel decking and cast-in-place concrete slabs:
- 12 1. Supported slabs have deflections that may cause areas of concrete to have thicknesses
13 greater than indicated on the drawings. Contractor is expected to provide that volume as
14 needed to finish the floor at the specified elevation. If specified floor finish tolerances are
15 not achieved during the concrete floor construction the Contractor shall install, at no cost to
16 the project, a self-leveling cementitious underlayment (BASF Corporation - MasterTop 110
17 SL or approved equivalent) to correct the floor flatness and levelness.

18 **3.3 CONSTRUCTION JOINTS**

- 19 A. Slabs: Where slab pour is to receive a subsequent topping or additional concrete, expose aggregate
20 in top surface by brooming in two directions at right angles to each other.
- 21 B. Vertical: Locate vertical construction joints in walls not farther than a maximum of 100 feet on center.
22 Coordinate joint locations with architectural design.
- 23 C. Horizontal: Locate horizontal joints in walls at underside of slabs and at the top of slabs and footings
24 unless otherwise indicated. At least 24 hours shall elapse between placing concrete in a wall and
25 placing concrete in an area supported by the walls, unless approved in writing by Structural Engineer.
- 26 D. Reinforcing: Stop all welded wire reinforcement and/or reinforcing at construction joint in slabs on
27 grade and provide dowel bars as detailed. Provide reinforcement at other construction joints as
28 detailed. Roughen and thoroughly clean the surface of the concrete, remove all laitance, and wet the
29 surface before placing new concrete against the joint. Slush vertical joints with a neat cement grout
30 before placing new concrete. Roughen entire surface at construction joints to remove surface paste
31 and expose aggregate.

32 **3.4 CONCRETE PLACEMENT**

- 33 A. Place concrete as continuously as possible until placement is complete. Do not place against
34 concrete that has attained initial set, except at authorized joints. If, for any reason, concrete pour is
35 delayed for more than 45 minutes, bulkhead off pour at last acceptable construction joint. Immediately
36 remove excess concrete and clean forms.
- 37 B. Do not begin to place concrete during periods of rain, sleet or snow unless adequate protection is
38 provided.
- 39 C. No concrete shall be cast onto or against sub-grades containing free water, frost, ice or snow. If earth
40 at bottom of forms has dried out, rewet so the soil is moist, but free of standing water and mud.
- 41 D. Notify the architect in advance if concrete is to be pumped.
- 42 E. Do not place concrete until all reinforcement is in place, forms have been thoroughly cleaned and
43 approval has been given.
- 44 F. Do not accept concrete delivered to the job site more than 90 minutes after initial mixing.

- 1 G. Concrete from its point of release to mixers, hoppers, or conveyances, shall not be permitted to drop
2 more than 5 feet (10 feet for concrete containing high range water reducers). Deposit concrete
3 directly into conveyances and directly from conveyances to final points of deposit. Sufficient
4 transportation equipment in good working order shall be on hand before work begins. All conveying
5 equipment must be clean and kept clean during concreting operations. Take every possible
6 precaution to prevent segregation or loss of ingredients.
- 7 H. Regulate rate of placement so concrete surface is kept level throughout; a minimum being permitted
8 to flow from one area to another. Use tremie heads spaced at approximately 10-foot intervals for
9 placing concrete in walls. Control rate of placement consistent with form design.
- 10 I. Deposit concrete in one continuous operation until section being placed has been completed. For
11 slab thicknesses greater than 12 inches, prevent excessive segregation of aggregate and high
12 temperatures in accordance with ACI 304 and ACI 308. Place concrete in wall forms in layers not
13 greater than 12 inches in depth, each layer being compacted by internal vibration before succeeding
14 layer is placed.
- 15 J. Place concrete as near as possible to its final position to prevent segregation or loss of materials. Do
16 not use vibrators to transport concrete within forms. Consolidate concrete in walls, columns, beams
17 and slabs or joist construction thicker than 8" with internal vibrators (8,000 to 12,000 VPM). Slabs
18 less than 8" thick may be consolidated with internal vibrators (9,000 to 13,500 VPM) or vibrating
19 screeds supported on forms, boards or rails, approved by SEOR, supplement vibration by forking or
20 spading by hand along surfaces adjacent to forms and construction joints. Be sure an adequate
21 number of operating vibrator units are on hand to properly consolidate quantity of concrete to be
22 placed, including spares for emergency use.
- 23 1. Vertically insert and remove handheld vibrators at constant intervals 18 to 30 inches apart.
24 Vibrate concrete the maximum amount and time required for complete consolidation,
25 without segregation, and release of entrapped air bubbles, but in no instance exceed 15
26 seconds per square foot of exposed surface.
- 27 K. Re-tempering of concrete shall not be permitted. Concrete that has stood more than 15 minutes after
28 leaving the mixer shall be discarded.
- 29 L. Exercise care in placing concrete over waterproof membranes, rigid insulation and/or protection
30 boards to avoid damaging those materials. Report damage immediately, and do not proceed until
31 damage is repaired.
- 32 M. Remove loose debris from hardened surfaces of previous pours, thoroughly wet and slush with a
33 neat cement grout immediately before placing new concrete, or apply bonding compound to surface
34 and let dry before placing new concrete.
- 35 N. Protect existing concrete work to be exposed to view and other finished materials from damage and
36 staining resulting from concreting operations. Handle concrete carefully to avoid dripping and
37 spillage. Remove spilled concrete from existing surfaces immediately. Covering sills, ledges, and
38 other surfaces with protective coverings may be necessary to protect the work.
- 39 O. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work
40 of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place
41 construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- 42 P. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as
43 shown on drawings. Set anchor rods for machines and equipment at correct elevations, complying
44 with diagrams or templates of manufacturer furnishing machines and equipment.
- 45 Q. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-
46 in inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

1 **3.5 CONCRETE FINISHES AND TOLERANCES**

2 A. Exposed Smooth Formed Surfaces: Remove forms and perform necessary repairs and patch to
3 produce surface finish-3.0 as specified in ACI 301. Apply the following to smooth-formed finished
4 concrete exposed to view in the finished work. Confirm finishes with architect prior to concrete
5 placement by submitting shop drawings indicating locations of all types of finishes.

6 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete
7 surfaces and rub with carborundum brick or another abrasive until producing a uniform color
8 and texture. Do not apply cement grout other than that created by the rubbing process.

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

13 **3.6 CONCRETE SLAB FINISHES AND TOLERANCES**

14 A. Trowel Finish:

15 1. Screed concrete to an even plane, float, then power trowel the surface.

16 2. Hand trowel the surface smooth and free of trowel marks. Continue hand troweling until a
17 ringing sound is produced as the floor is troweled.

18 3. Provide trowel finish as indicated on the drawings and at the following locations:

19 a. Concrete floors exposed in finished work unless otherwise indicated.

20 b. Slabs to receive curing compounds and sealers.

21 c. Slabs to receive resilient flooring or carpet.

22 d. Slabs to receive waterproof membranes.

23 B. Fine Broom Finish:

24 1. Screed concrete to an even plane, float, then power trowel the surface. Provide fine hair
25 broom finish perpendicular to slope, free of loose particles, ridges, projections, voids and
26 concrete droppings.

27 2. Provide fine broom finish as indicated on the drawings and at the following locations:

28 a. Stoop slabs.

29 b. Raised curbs and walkway areas.

30 c. Slabs to receive thin set ceramic tile.

31 C. Broom Finish:

32 1. Screed concrete to an even plane and then float. Immediately after concrete has received
33 a floated finish, give the concrete surface a coarse transverse scored texture by drawing a
34 coarse broom across the surface.

35 2. Provide as indicated on the drawings and at the following locations:

36 a. ADA ramp slabs.

37 b. Exterior walkway slabs.

38 D. Floor Finish Tolerances: Floor finish tolerances shall be measured by placing a freestanding
39 (unleveled) 10-foot straightedge anywhere on the slab and allowing it to rest upon two high spots
40 within 72 hours after placement of slab and removal of shoring (if present). The gap at any point
41 between the straightedge and the floor (and between the high spots) shall not exceed:

42 1. Slab on Grade: 1/4"

1 E. Slab Drainage: Finish all concrete slabs to proper elevations to ensure that all surface moisture will
2 drain freely to floor drains, and that no puddle areas exist. Contractor shall bear the cost of corrections
3 to provide positive drainage.

4 F. Special Tolerances for Concrete Slabs: No abrupt change in vertical elevation of 1/4" or more is
5 acceptable at the interface between slabs and within areas where pedestrian traffic is expected:

6 **3.7 CONCRETE CURING**

7 A. Freshly placed concrete shall be protected from premature drying and excessively hot temperatures.

8 B. Concrete other than high-early strength shall be maintained above 50°F and in a moist condition for
9 at least the first 7 days after placement, except when special curing is used. Special curing
10 procedures shall not be used without written permission from the SEOR.

11 C. Formed surfaces shall be cured by leaving the formwork in place during the curing period.

12 D. Protect concrete from excessive changes in temperature during the curing period and at the
13 termination of the curing process. Changes in the temperature of the concrete shall be as uniform as
14 possible and shall not exceed 5°F in any one hour or 50°F in any 24-hour period.

15 E. Protect concrete from injury from the elements until full strength is developed. Protect from
16 mechanical injury.

17 F. During cold weather construction, all footings shall be protected from frost penetration until the
18 building is enclosed and temporary heat is provided.

19 **3.8 SLAB CURING**

20 A. Begin curing after finishing concrete, but not before free water has disappeared from concrete
21 surface. Use one of the methods described below.

22 B. Moisture-Retaining-Cover Curing for Concrete Floors Not Exposed in Final Condition: Cover
23 concrete surface with waterproof sheet material as soon as finishing operations are complete and
24 the concrete is sufficiently hard to be undamaged by covering. The cover shall be placed flat on the
25 concrete surface, avoiding wrinkles. Sprinkle concrete with water as necessary during application of
26 covering. Place in widest practicable width, with sides and ends lapped at least 12 inches, and seal
27 with waterproof tape or adhesive. Verify that the concrete is continuously wet under the sheets;
28 otherwise, add water through soaker hoses under the sheets. Weight down covering to prevent
29 displacement. Immediately repair any holes or tears during the curing period using polyethylene
30 sheet and waterproof tape. Curing process shall be maintained for a minimum of 7 days.

31 C. Moisture-Retaining-Fabric Curing for Concrete Floors to Remain Exposed: Cover concrete surface
32 with moisture retaining fabric as soon as finishing operations are complete and the concrete is
33 sufficiently hard to be undamaged by covering. The cover shall be installed in accordance with
34 manufacturer's written recommendations, in largest practical widths. Wet the slab to rejection, then
35 thoroughly wet fabric side of cover and install with poly side up. Lap over adjacent covers a minimum
36 of 18". Wet all laps and outside edges to prevent displacement and to ensure intimate contact with
37 concrete and adjacent covers. Rewet as necessary and protect covers from damage during curing
38 process.

39 1. After minimum 7-day cure, remove moisture retaining fabric in sections.

40 2. A maximum of 3,500 square feet of concrete curing cover may be removed at any one time.
41 At no time shall the exposed area be permitted to dry prior to completion of the floor
42 scrubbing process.

- 1 3. Using a high-powered floor scrubber capable of a minimum 80 pounds head pressure, and
2 a mild citrus-based detergent that does not damage or mar the surface in any way, scrub
3 the floor to remove any minerals or soluble salts that may have accumulated at the floor
4 surface. Rinse area thoroughly with clean fresh water. Remove water and allow floor to dry.
5 If whitening occurs during drying, repeat scrubbing process before floor dries until no
6 whitening occurs during drying.
- 7 4. All areas of the floor shall remain wet during floor scrubbing process. Expose only the
8 amount of floor surface that can be cleaned before any drying occurs without exceeding the
9 maximum allowable exposed area.
- 10 D. Curing Compound: Apply uniformly in continuous operation by low pressure spray equipment or roller
11 as soon as finishing operations are complete, free water on the surface has disappeared and no
12 water sheen can be seen. Follow the manufacturer's written instructions. Recoat areas subjected to
13 heavy rainfall within three hours after initial application. Maintain continuity of coating and repair
14 damage during curing period. Verify compatibility of the curing compound with paint, finishes, or
15 toppings that require positive bond to the concrete. If curing compound is not compatible with paint
16 finishes or toppings, utilize a dissipating curing compound and remove in accordance with the
17 manufacturer's recommendations.

18 **3.9 PENETRATING LIQUID FLOOR TREATMENTS**

- 19 A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment
20 according to manufacturer's written instructions.
- 21 B. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface
22 repairs in accordance with manufacturer's written instructions.
- 23 C. Do not apply to concrete that is less than seven days old.
- 24 D. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat
25 brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second
26 coat in a similar manner if surface is rough or porous.

27 **3.10 JOINT FILLING**

- 28 A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
- 29 B. Do not fill joints until construction traffic has permanently ceased.
- 30 C. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of
31 joint clean and dry.
- 32 D. Install semi-rigid joint filler in saw-cut joints and in formed joints. Overfill joint and trim joint filler flush
33 with top of joint after hardening.

34 **3.11 APPLICATION OF FLOOR SEALER - FINISH COAT**

- 35 A. Give concrete floors as indicated in Room Finish Schedule and where exposed in finished Work,
36 second coat of curing and sealing compound immediately prior to Substantial Completion.
- 37 B. Clean floors and apply sealer strictly according to manufacturer's instructions. Dilution and coverage
38 shall be as recommended by the manufacturer. Apply sealer evenly.

39 **3.12 COLD WEATHER CONCRETING**

- 40 A. Definition: Cold weather shall be defined as a period when for more than three successive days the
41 average daily outdoor temperature drops below 40°F. The average daily temperature is the average
42 of the highest and lowest temperature during the period from midnight to midnight. When
43 temperatures above 50°F occur during more than half of any 24-hour duration, the period shall not
44 be regarded as cold weather.

- 1 B. All cast-in-place concrete work occurring during cold weather shall conform to all requirements of
2 ACI 306.1, "Standard Specification for Cold Weather Concreting", published by the American
3 Concrete Institute, Detroit, Michigan, except as modified by the contract documents or this
4 specification.
- 5 C. Planning: The General Contractor, concrete contractor, concrete supplier and the architect shall have
6 a pre-construction conference to outline the cold weather concreting operations concerning the
7 placing, finishing, curing and protection of the concrete during cold weather. Pre-construction
8 conference shall occur before cold weather is expected to occur.
- 9 D. Detailed procedure submittal: Concrete contractor shall prepare and submit for review detailed
10 procedures for the production, transportation placement, protection, curing and temperature
11 monitoring of concrete during cold weather. Include procedures to be implemented upon abrupt
12 changes in weather conditions. Do not begin cold weather concreting until these procedures have
13 been reviewed and approved.
- 14 E. Mixing: Concrete flatwork poured in cold weather shall be proportioned to obtain a lower slump to
15 minimize the amount of bleed water during finishing. All bleed water should be skimmed off flatwork
16 prior to troweling. Concrete that will be exposed to cycles of freezing and thawing while saturated
17 should be properly air entrained as outlined in this specification.
- 18 F. Protection of Concrete: Cure and protect concrete against damage from freezing for a minimum
19 period of 72 hours, unless approved by the structural engineer. The protection period may be reduced
20 according to ACI 306.1 requirements. Concrete contractor shall submit a letter of request to reduce
21 the protection period, by outlining the method used to achieve the reduction per ACI 306.1.

- 22 1. When practical for the construction schedule, formwork shall be insulated and remain in
23 place for at least the required protection period.

- 24 G. Concrete Temperatures: The minimum temperature of concrete immediately after placement shall
25 be as specified in the following table.

Section Size	Minimum temperature of concrete as placed and maintained during the protection period	Maximum gradual decrease in surface temperature during any 24 hours after the end of the protection.	Mixing Temperatures		
			Above 30°F	0 to 30°F	Below 0°F
< 12 in	55°F	50°F	60°F	65°F	70°F
12-36 in	50°F	40°F	55°F	60°F	65°F
36-72 in	50°F	30°F	50°F	55°F	60°F
> 72 in	50°F	20°F	45°F	50°F	55°F

- 26 H. Mixing Temperatures: As the ambient air temperature decreases the concrete mixing temperature
27 shall be increased to compensate for the heat lost in the period between mixing and placement. The
28 concrete supplier shall use one or both of the following methods for increasing the concrete
29 temperature.

- 30 1. Heating the mixing water to a temperature necessary to offset the temperature losses during
31 transport. Supplier shall not heat water to temperatures in excess of 140°F, without taking
32 special precautions as outlined in ACI 306.

- 33 2. Heating the aggregate with a circulated steam piping system.

- 34 I. Temperature measurements: The Contractor shall be responsible for monitoring and recording the
35 concrete temperatures during placement and throughout the protection period.

- 1 1. Inspection personnel shall keep a record of the date, time, outside air temperature,
2 temperature of concrete as placed, and weather conditions.
- 3 2. Temperature of the concrete and the outside air shall be recorded at regular intervals but
4 not less than twice in a 24-hour period. The record shall include temperatures at several
5 points within the enclosure and on the concrete surface of sufficient frequency to determine
6 a range of temperatures.
- 7 3. Inspection agency shall submit the temperature logs to the Architect for permanent job
8 records.

9 **3.13 HOT WEATHER PROTECTION**

- 10 A. Definition: Hot weather shall be defined as any combination of high ambient temperature, low relative
11 humidity, high winds and intense solar radiation that leads to higher than usual evaporation. The
12 table below defines low relative humidity based on air temperature. For a given air temperature, if
13 the relative humidity is equal to or less than the specified minimum, provisions for hot weather
14 concreting shall be as follows:

Air Temperature	Minimum Relative Humidity
105°F	90%
100°F	80%
95°F	70%
90°F	60%
85°F	50%
80°F	40%
75°F	30%

- 15 B. Scheduling: When hot weather is expected, adjust concrete placement schedules to avoid placing or
16 finishing during the period from noon until 3:00 pm. When possible, slab pours should be delayed
17 until the building is enclosed to protect the concrete from wind and direct sunlight, Construction
18 schedule shall account for 7-day moist curing period.
- 19 C. Mixing: Concrete supplier shall adjust mix designs and admixtures to minimize slump loss. Concrete
20 shall be mixed at a water-cement, which is lower than the specified maximum to allow for the
21 adjustment of slump by addition of water in the field. Water reduction shall be accomplished without
22 reducing initial slump by increasing dosage of water reducing admixture.
- 23 D. Preparation: Do not order concrete earlier than is required to avoid delays. Cool forms, subgrades
24 and reinforcing bars with water spray from fog nozzle prior to concrete placement.
- 25 E. Delivery: Site traffic shall be coordinated and delivery times scheduled to minimize waiting times for
26 concrete trucks.
- 27 F. Placement: Preparations shall be made to place and consolidate the concrete at the fastest possible
28 rate. Maintain a continuous flow of concrete to the job site to avoid development of cold joints, during
29 placement of slabs, apply fog spray to prevent moisture loss without causing surplus water to stand
30 on concrete surface.
- 31 G. Finishing: Finish concrete as fast as practical. Continue fogging concrete during finishing. Where
32 fogging is not possible, apply sprayable moisture-retaining film between finishing passes.
- 33 H. Curing: Formed concrete shall be covered with a waterproof material to retain moisture. Flat work
34 shall be moisture cured as described in this specification. Moist curing shall continue for at least 7
35 days.

36 **3.14 FIELD QUALITY ASSURANCE**

- 37 A. Independent Testing Agency and Special Inspector shall each perform their prescribed inspection,
38 sampling, and testing services as described in Part 1 of this specification section.

1 B. In cases where samples have not been taken or tests conducted as specified or strength of laboratory
2 test cylinders for a particular portion of the structure fails to meet requirements of ACI 301, for
3 evaluation of concrete strength, Structural Engineer shall have the right to order compressive or
4 flexural test specimens or both be taken from the hardened concrete according to ASTM C42, load
5 tests according to ACI 318, or such other tests as may be necessary to clearly establish the strength
6 of the in situ concrete, and such tests shall be paid for by the Contractor. Where cores have been
7 cut from work, Contractor shall fill void with dry-pack and patch the finish the match the adjacent
8 existing surfaces.

9 **3.15 REPAIR OF DEFECTIVE AREAS**

10 A. All repair of defective areas shall be made, with prior approval of Architect and SEOR as to method
11 and procedure, in accordance with Section 5 of ACI 301, except specified bonding compound must
12 be used. Cosmetic repairs of minor defects in exposed concrete surfaces shall be in a manner
13 acceptable to the Architect. Defective areas shall be deemed when:

- 14 1. Tests on core or prism specimens fail to show specified strengths.
- 15 2. Not formed as indicated or detailed.
- 16 3. Not plumb or level where so indicated or required to receive subsequent work.
- 17 4. Not true to intended grades and levels.
- 18 5. Cut, filled, or resurfaces, unless under direction of the SEOR.
- 19 6. Debris is embedded therein.
- 20 7. Not fully in conformance with provisions of the drawings.
- 21 8. Damaged by hot or cold weather conditions.
- 22 9. Mixing time exceeds 90 minutes from ready-mix plant to the time of deposit.

23 B. Patch form tie holes at the following locations:

- 24 1. Unfinished exposed concrete (not scheduled for painting, plus at board formed concrete
25 finish).
- 26 2. All other areas: Prime voids with bonding compound and fill with patching mortar. Strike
27 flush without overlap, float to uniform texture to match adjacent surfaces.
- 28 3. Exposed areas scheduled for spray texture:
 - 29 a. Remove projections and protrusions: 1/16" or larger.
 - 30 b. Remove continuous ridges 1/32" or larger.
 - 31 c. Fill voids and pin holes.
- 32 4. Exposed areas scheduled for paint or epoxy:
 - 33 a. Remove projections, ridges, and other protrusions 1/32" or larger.
 - 34 b. Fill voids and pin holes 1/16" or larger.
- 35 5. Exposed areas not scheduled for paint or other finishes:
 - 36 a. Remove projections, ridges and other protrusions not conforming to requirements
37 specified under Section 03 10 00.
 - 38 b. Fill voids and pin holes not conforming to requirements specified under Section
39 03 10 00.

40 C. All structural repairs shall be made, with prior approval of the Architect/Engineer, as to method and
41 procedure, using the specified epoxy adhesive and/or epoxy mortar.

42 D. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls,
43 air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and
44 other discolorations that cannot be removed by cleaning.

- 45 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than
46 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of

- 1 cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes
2 and voids with bonding agent. Fill and compact with patching mortar before bonding agent
3 has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with
4 bonding agent.
- 5 2. Repair defects on surfaces exposed to view by blending white Portland cement and
6 standard Portland cement so that, when dry, patching mortar will match surrounding color.
7 Patch a test area at inconspicuous locations to verify mixture and color match before
8 proceeding with patching. Compact mortar in place and strike off slightly higher than
9 surrounding surface.
- 10 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural
11 performance as determined by Architect.
- 12 E. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify
13 surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to
14 drain for trueness of slope and smoothness; use a sloped template.
- 15 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts,
16 honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate
17 to reinforcement or completely through unreinforced sections regardless of width, and other
18 objectionable conditions.
- 19 2. After concrete has cured at least 14 days, correct high areas by grinding.
- 20 3. Correct localized low areas during or immediately after completing surface finishing
21 operations by cutting out low areas and replacing with patching mortar. Finish repaired
22 areas to blend into adjacent concrete.
- 23 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
24 Prepare, mix, and apply repair underlayment and primer according to manufacturer's written
25 instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match
26 adjacent floor elevations.
- 27 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low
28 areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor
29 elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's
30 written instructions to produce a smooth, uniform, plane, and level surface.
- 31 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter,
32 by cutting out and replacing with fresh concrete. Remove defective areas with clean, square
33 cuts and expose steel reinforcement with at least 3/4-inch clearance all around. Dampen
34 concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching
35 concrete of same materials and mix as original concrete except without coarse aggregate.
36 Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner
37 as adjacent concrete.
- 38 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
39 Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose
40 particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching
41 mortar before bonding agent has dried. Compact patching mortar and finish to match
42 adjacent concrete. Keep patched area continuously moist for at least 72 hours.

43 **3.16 CEMENT GROUT AND DRY-PACK**

- 44 A. Cement Grout: Thoroughly mix sufficient quantities to avoid combining different batches of grout mix.
45 Ensure that grout completely fills all spaces and voids. Level, screed, or cut flush excess grout to
46 produce smooth, neat, even exposed surfaces.

1 B. Dry-Pack: Thoroughly blend dry ingredients prior to mixing with water. Forcibly pack mixture to
2 complete fill voids and spaces.

3 **3.17 CLEANING**

4 A. Clean exposed concrete to remove laitance, efflorescence and stains.

5 **END OF SECTION**

SECTION 03 35 43

POLISHED CONCRETE FINISHING

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes polished concrete finishing, including scoring, grouting and sealing.
- B. Related Sections:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. As placed horizontal concrete: Refer to Section 03 30 00 – Cast-In-Place Concrete.

1.3 DEFINITIONS

- A. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of polished concrete.

1.4 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical data, including Material Safety Data Sheet (MSDS) and installation instructions, for each product specified.
- B. LEED Submittals:
 - 1. Indoor Environmental Quality
 - a. Product Data for Credit IEQ 4.2: For interior field-applied traffic coatings, documentation including printed statement of VOC content.
- C. Polishing Schedule: Submit plan showing polished concrete surfaces and schedule of polishing operations for each area of polished concrete before start of polishing operations. Include locations of all joints, including construction joints.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 10 years of documented experience producing the specified products.
- B. Installer Qualifications: Minimum 5 years of documented experience with work of similar scope and complexity required by this Project.
- C. Mockups: Build mockups to demonstrate typical joints, surface finish, tolerances, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete a mockup submittal for review.
 - 2. Construct an 8 feet by 8 feet for each mockup at location indicated on the Drawings.

- 1 3. Provide individual mockups for each gloss level required.
- 2 a. Mock-up to demonstrated LVL 1 ground finish and LVL 2 honed
- 3 b. Existing Epoxy tie in to new Polished Concrete
- 4 c. Mock-up Finish: Unsealed concrete.
- 5 d. Mock-up Finish: Sealed concrete with non-slip additive.
- 6 4. Construct mockup using materials, processes, and techniques required for the work. Incorporate
- 7 representative scored joints according to Project requirements.
- 8 5. Mockup to be sealed by the Installer who will actually perform the work for the Project.
- 9 6. Notify Architect and Owner a minimum of seven calendar days in advance of the date scheduled
- 10 for each mockup construction.
- 11 7. Obtain the Architect's and Owner's acceptance of each mockup prior to commencement of the
- 12 work.
- 13 8. Each mockup to remain until completion of the work to serve as a quality control standard for the
- 14 work. Provide suitable protections to preclude damage to mockup.
- 15 9. Demonstrate curing, finishing, and protecting of polished concrete.
- 16 10. Test section shall be prepared and treated as specified to verify and approve the suitability of the
- 17 product for the intended purpose. The entire surface of the test section shall be inspected after
- 18 completion to verify and approve the adequacy of the wet and dry slip resistance.
- 19 11. Subject to compliance with requirements, approved mockups may become part of the completed
- 20 Work if undisturbed at time of Substantial Completion.

21 **1.6 PREINSTALLATION CONFERENCE**

- 22 A. Seven calendar days prior to scheduled date of installation, conduct a meeting at Project site to discuss
- 23 requirements, including application methods. Attendees to include Architect, Owner, Contractor, Installer,
- 24 and manufacturer's authorized field representative.

25 **PART 2 - PRODUCTS**

26 **2.1 POLISHING**

- 27 A. Polished New Placed Concrete (**CONC-1**):
- 28 1. LVL 1 ground finish or LVL 2 honed as required for a consistent finish.
 - 29 2. Level as approved by mock-up.
- 30 B. Polished Existing Concrete (**CONC-2**): Finish level as approved by mock-up.
- 31 1. LVL 1 ground finish or LVL 2 honed as required for a consistent finish.
 - 32 2. Level as approved by mock-up.

33 **2.2 LIQUID FLOOR TREATMENTS**

- 34 A. Chemically Reactive Liquid Floor Hardener: Clear, waterborne solution of inorganic silicate or silicate
- 35 materials and proprietary components; odorless; that penetrates, hardens, and is suitable for polished
- 36 concrete surfaces.
- 37 1. Product: Consolideck LS as manufactured by ProsoCo
 - 38 2. Form: Clear, water-like liquid.
 - 39 3. pH: 11.0
 - 40 4. Active Content: 14.5 percent
 - 41 5. Total Solids: 14.5 percent
 - 42 6. VOC Content: 0 grams per Liter. Complies with all known national, state and district AIM VOC
 - 43 regulations.
 - 44 7. Flash Point: Not flammable
 - 45 8. Freeze Point: 32 degrees Fahrenheit (0 degrees Celsius)
 - 46

- 1 B. Liquid Floor Sealer: Clear, solvent solution of neat silane materials and proprietary components; that
2 penetrates surface, and is suitable for polished concrete surfaces.
3 1. Product: SLX100® Water & Oil Repellent <350 as manufactured by Prosoco
4 2. Form: Clear liquid, slight solvent odor
5 3. Specific Gravity: 0.913
6 4. Active Content: 93 percent
7 5. pH: not applicable
8 6. Flash Point: 80 degrees F (27 degrees C) ASTM D 3278
9 7. Freeze Point: less than -22 degrees F (less than -30 degrees C)
10 8. VOC Content: Reactive Penetrating Sealer: maximum content is 350 grams per Liter.
11 9. Alternate: Consolideck® PolishGuard as manufactured by Prosoco.
12 C. Non-Slip Additive:
13 1. Increte Systems SHUR-GRIP:
14 a. Composition: Clear spherical polypropylene powder.
15 b. Particle Size: 50 Mesh.
16 c. Application: 8 fluid oz/ gallon of sealer.
17 D. Liquid Floor Sealer: Copolymer lithium silicate hardener.
18 1. Product: Consolideck® LSGuard as manufactured by Prosoco.
19 2. Form: Opaque white liquid
20 3. Specific Gravity: 1.08
21 4. pH: 11.0
22 5. Active Content: 22 percent
23 6. Total Solids: 22 percent (ASTM D2369)
24 7. VOC Content: less than 100 g/L. Complies with all known national, state and district AIM VOC
25 regulations.
26 8. Flash Point: greater than 212 degrees Fahrenheit (greater than 22 degrees Celsius) ASTM D3278
27 9. Freeze Point: 32 degrees Fahrenheit (0 degrees Celsius)

28 **2.3 SCORED JOINT GROUT**

- 29 A. Sanded grout using liquid acrylic grout additive
30 B. Sand-Portland Cement Grout: Consisting of white or gray cement and white or colored aggregate as
31 required to produce color indicated.
32 C. High-Performance Tile Grout: ANSI A118.7.
33 1. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to
34 prepackaged dry-grout mix.
35 2. Grout Color: To be determined with mock-up construction.

36 **PART 3 - EXECUTION**

37 **3.1 EXAMINATION**

- 38 A. Examine areas and conditions under which the concrete work will be performed and identify conditions
39 detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions
40 have been corrected.
41 B. Quality Control:
42 1. Each batch of concrete shall comply with the approved design mix.
43 2. Each batch shall be batched, transported, placed, finished and cured consistent with conditions
44 documented for the approved mock-up.
45 3. Each batch of concrete shall to be tested for finish quality and any non-compliance with the mock-
46 up is to be reported to Architect.
47 C. Interior Applications: Concrete substrates shall have a moisture vapor emission rate of less than 5
48 lbs./1000 sq. ft. per 24 hour based on a 72 hour test period according to ASTM F 1869.

49 **3.2 SCHEDULE OF FINISHES**

- 50 A. Application: Toilet rooms, and food service areas.
51 1. Finish: Sealed polished concrete with non-slip additive.
52 B. Application: General areas scheduled for polished concrete.
53 1. Finish: Unsealed polished concrete.
54

1 **3.3 PREPARATION**

2 A. Surface Preparation:

- 3 1. The surface of the concrete shall be lightly mechanically abraded to remove weak cement paste
4 and contaminants. The final surface preparation should approximate a Concrete Surface Profile of
5 1, (CSP1 as designated by the International Concrete Repair Institute, Alexandria, Virginia).
6 Methods for mechanical abrasion include:
7 a. Pressure Washing: Use a pressure washer equipped with a fan tip and rated for a minimum
8 pressure capability of 4000 psi.
9 b. Scrubbing with a rotary floor machine with a brush.
10 c. Light sanding of the surface.
11 2. Rinse concrete substrates until rinse water is completely clean.
12 3. Surfaces shall be tested to receive sealer by spotting with water. Water should immediately darken
13 the substrate and be readily absorbed. If water beads and does not penetrate or only penetrates in
14 some areas, perform additional surface preparation and testing. On denser concrete floors, sand
15 lightly to open up surfaces. Retest and continue surface preparation until water spots immediately
16 darken and uniformly penetrate concrete surfaces.

17 **3.4 POLISHING**

18 A. Polished New Concrete: Finish level as approved by mock-up.

- 19 1. Class B - Fine aggregate (salt and pepper) Finish. (Fine aggregate exposure with little or no
20 medium aggregate at random locations).
21 2. Level: As approved by mock-up.

22 B. Apply polished concrete finish system to cured and prepared slabs to match accepted mockup.

- 23 1. Machine grind floor surfaces to receive polished finishes level and smooth.
24 a. Remove existing coatings (for thick coatings, use a 16- or 20-grit diamond abrasive or more
25 aggressive tool specifically for coating removal).
26 b. Seal cracks and joints with an epoxy or other semi-rigid filler.
27 c. Grind with a 30- or 40-grit metal-bonded diamond.
28 d. Grind with an 80-grit metal-bonded diamond.
29 e. Grind with a 150-grit metal-bonded diamond (or finer, if desired).
30 2. Apply a chemical hardener to densify the concrete.
31 3. Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match
32 approved mockup.
33 a. Polish with a 100- or 200-grit resin-bond diamond, or a combination of the two.
34 b. Polish with a 400-grit resin-bond diamond.
35 c. Polish with an 800-grit resin-bond diamond.
36 4. Control and dispose of waste products produced by grinding and polishing operations.
37 C. Scoring: Score decorative jointing in concrete surfaces 1/8 inch deep with diamond blades to match pattern
38 indicated. Rinse until water is clear.
39 1. Joint Width and Pattern: Refer to Drawings.
40 2. Grout joints.
41 3. Grout joints before sealing application.

42 **3.5 SEALING APPLICATION**

- 43 A. Apply sealer and non-slip additive according to manufacturer's printed instructions. Maintain a wet edge at
44 all times.
45 B. Allow sealer to completely dry before applying additional coats.
46 C. Apply second coat of sealer at 90 degrees to the direction of the first coat using the same application
47 method and rates.
48 D. Seal horizontal joints in areas subject to pedestrian traffic.

49 **END OF SECTION**

SECTION 04 20 10

ARCHITECTURAL & GLAZED MASONRY

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Pre-faced concrete masonry units.
 - 2. Mortar and grout.
 - 3. Masonry-joint reinforcement.
 - 4. Miscellaneous masonry accessories.
- B. Related Requirements:
 - 1. Section 01 43 39 – Mockups for description of construction required to complete a mockup submittal for review.
 - 2. Section 01 81 13.14 “Sustainable Design Requirements” for submittal and product requirements.
 - 3. 04 22 00 “Reinforced Unit Masonry” for structural masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:

- 1 1. Product Certificates: For regional materials, indicating location of material manufacturer and point
2 of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for
3 each regional material.
4 C. Samples for Verification: For each type and color of the following:
5 1. Pre-faced CMUs.
6 2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

7 1.5 INFORMATIONAL SUBMITTALS

- 8 A. Material Certificates: For each type and size of the following:
9 1. Masonry units.
10 a. Include material test reports substantiating compliance with requirements.
11 2. Cementitious materials. Include name of manufacturer, brand name, and type.
12 3. Mortar admixtures.
13 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
14 5. Anchors, ties, and metal accessories.
15 B. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.
16 1. Include test reports for mortar mixes required to comply with property specification. Test according
17 to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and
18 ASTM C91/C91M for air content.
19 2. Include test reports, according to ASTM C1019, for grout mixes required to comply with
20 compressive strength requirement.
21 C. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to
22 be used to comply with requirements.
23 D. Sustainability:
24 1. Health Product Declaration. Submit complete Health Product Declaration with full disclosure of
25 known hazards in compliance with the Health Product Declaration open Standard.
26 2. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing
27 system, documentation including printed statement of VOC content.
28 a. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-
29 emitting materials.
30 3. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
31 and cost.
32 4. Regional Materials: Products shall be manufactured within 500 miles of Project site.
33 5. Product Data: Certification of product manufacturing origin.

34 1.6 QUALITY ASSURANCE

- 35 A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic
36 effects, and to set quality standards for materials and execution. Refer to Section Section 01 43 39 –
37 Mockups for construction requirements.
38 1. Build mockups for typical interior wall in sizes approximately 48 inches long by 48 inches high by
39 full thickness, including face and backup wythes and accessories.
40 a. Include a sealant-filled joint at least 16 inches long in mockup.
41 2. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and
42 sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
43 a. Approval of mockups does not constitute approval of deviations from the Contract
44 Documents contained in mockups unless Architect specifically approves such deviations in
45 writing.
46 3. Subject to compliance with requirements, approved mockups may become part of the completed
47 Work if undisturbed at time of Substantial Completion.

48 1.7 DELIVERY, STORAGE, AND HANDLING

- 49 A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location,
50 cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install
51 until they are dry.
52 B. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in
53 delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
54 C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

55 1.8 FIELD CONDITIONS

- 56 A. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or
57 painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

- 1 B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do
2 not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing
3 conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
4 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and
5 higher and will remain so until masonry has dried, but not less than seven days after completing
6 cleaning.
7 C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in
8 TMS 602/ACI 530.1/ASCE 6.

9 **PART 2 - PRODUCTS**

10 **2.1 MANUFACTURERS**

- 11 A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a
12 uniform blend within the ranges accepted for these characteristics, from single source from single
13 manufacturer for each product required.
14 B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for
15 exposed masonry, from single manufacturer for each cementitious component and from single source or
16 producer for each aggregate.

17 **2.2 UNIT MASONRY, GENERAL**

- 18 A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the
19 Contract Documents.
20 B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain
21 chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in
22 the completed Work.
23 C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
24 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified
25 testing agency acceptable to authorities having jurisdiction.

26 **2.3 CONCRETE MASONRY UNITS**

- 27 A. Regional Materials: Verify CMUs are manufactured within 500 miles (800 km) of Project site from
28 aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured,
29 within 500 miles (800 km) of Project site.
30 B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of
31 adjacent units unless otherwise indicated.
32 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and
33 other special conditions.
34 2. Provide bullnose units for outside corners unless otherwise indicated.
35 C. Pre-faced CMUs: Lightweight hollow concrete units complying with ASTM C90, with manufacturer's
36 standard smooth resinous facing complying with ASTM C744.
37 1. Concrete Block: ASTM C 90 for hollow and solid load-bearing units; Type 1 (moisture controlled).
38 2. Facing Components: Facing ingredients shall be facing compound made with polymers, supplied to
39 approved manufacturers.
40 3. Size: Manufactured to dimensions and with pre-faced surfaces having 1/16-inch-wide returns of
41 facing to create 1/4-inch-wide mortar joints with modular coursing.
42 D. Basis of Design: Pre-Faced Concrete Block: "Spectra-Glaze® II Units."
43 1. Licensed or authorized in writing by The Spectra Group through Spectra Industrial Licensing
44 Corporation, Baltimore, Maryland.
45 E. Types:
46 1. CMU-2A GLAZED BLOCK (CMU)
47 a. MFR: Spectra Glaze;
48 b. PRODUCT: 4" GLAZED BLOCK - SINGLE SIDE;MODEL: 4S
49 c. COLOR: LT Olive;
50 d. NOMINAL SIZE: 4"W X 8"H X 16"L
51
52

- 1 2. CMU-2B GLAZED BLOCK COVERED BASE (CMU)
2 a. MFR: Spectra Glaze;
3 b. PRODUCT; 4" GLAZED BLOCK - SINGLE SIDED WITH COVE BASEMODEL: 4G
4 c. COLOR: LT Olive;
5 d. NOMINAL SIZE: 4"W X 8"H X 16"L
6
7 3. CMU-2C GLAZED BLOCK COVERED BASE CAP (CMU)
8 a. MFR: Spectra Glaze;
9 b. PRODUCT; 4" GLAZED BLOCK - SINGLE SIDED WITH COVE BASEMODEL: 1-4VGCC0
10 c. COLOR: LT Olive;
11 d. NOMINAL SIZE: 1"W X 16"H X 4"L
12
13 4. CMU-2D GLAZED BLOCK EDGE CAP (CMU)
14 a. MFR: Spectra Glaze;
15 b. PRODUCT; 4" GLAZED BLOCK - SINGLE SIDED WITH COVE BASEMODEL: 1-4CC0
16 c. COLOR: LT Olive;
17 d. NOMINAL SIZE: 1"W X 16"H X 4"L
18
19 5. CMU-2E GLAZED BLOCK DOUBLE SIDED (CMU)
20 a. MFR: Spectra Glaze;
21 b. PRODUCT; 4" GLAZED BLOCK - SINGLE SIDED WITH COVE BASEMODEL: 4ST
22 c. COLOR: DP Olive;
23 d. NOMINAL SIZE: 8"W X 16"H X 4"L

24 **2.4 MORTAR AND GROUT MATERIALS**

- 25 A. Regional Materials: Manufacture, extract, harvest, or recover aggregate for mortar and grout, cement, and
26 lime within 500 miles (800 km) of Project site.
27 B. Colored Cement Products: Packaged blend made from portland cement and hydrated lime or mortar
28 cement and mortar pigments, all complying with specified requirements, and containing no other
29 ingredients.
30 1. Formulate blend as required to produce color indicated or, if not indicated, as selected from
31 manufacturer's standard colors.
32 C. Aggregate for Mortar: ASTM C144.
33 1. White-Mortar Aggregates: Natural white sand or crushed white stone.
34 D. Water: Potable.

35 **2.5 TIES AND ANCHORS**

- 36 A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch
37 cover on outside face.
38 B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with
39 the following unless otherwise indicated:
40 1. Mill-Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A641/A641M, Class 1 coating.
41 C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or
42 horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
43 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, wire. Mill-galvanized wire
44 may be used at interior walls unless otherwise indicated.
45 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, wire. Mill-galvanized wire
46 may be used at interior walls unless otherwise indicated.
47 D. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal
48 adjustment but resist tension and compression forces perpendicular to plane of wall.
49 E. Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod 6 inches long
50 welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube.
51 Fabricate from steel, hot-dip galvanized after fabrication.

52 **2.6 MORTAR AND GROUT MIXES**

- 53 A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-
54 repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
55 1. Do not use calcium chloride in mortar or grout.
56 2. Use portland cement-lime or mortar cement mortar unless otherwise indicated.

- 1 B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure
2 quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to
3 Project site.
- 4 C. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of
5 mortar for applications stated unless another type is indicated.
- 6 1. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- 7 D. Pigmented Mortar: Use colored cement product.
- 8 1. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
- 9 2. Mix to match Architect's sample.

10 **PART 3 - EXECUTION**

11 **3.1 EXAMINATION**

- 12 A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and
13 other conditions affecting performance of the Work.
- 14 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to
15 performance of the Work.
- 16 B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations
17 of piping.
- 18 C. Proceed with installation only after unsatisfactory conditions have been corrected.

19 **3.2 INSTALLATION, GENERAL**

- 20 A. Build chases and recesses to accommodate items specified in this and other Sections.
- 21 B. Leave openings for equipment to be installed before completing masonry. After installing equipment,
22 complete masonry to match construction immediately adjacent to opening.

23 **3.3 PREFACED BLOCK INSTALLATION**

- 24 A. Cove Base at Thin Floor Coverings: Set cove base tight to a straight, level floor so edge of floor covering
25 will hide the joint.
- 26 B. Workmanship: Align glazed faces plumb, level and true to line; uniform joint widths carefully tooled; joints
27 arranged neat and symmetrical, cut units sized and located for best appearance; free of imperfections
28 detracting from overall appearance when viewed at 90 degrees from 5 feet.
- 29 C. Cutting: For all cuts, including chases, holes and notches for pipes, switch boxes, etc., use saw and other
30 power tools.
- 31 D. Jointing: Strike and tool setting mortar.
- 32 E. Scored-Face Block: Lay block in stack bond when aligned vertical joint appearance is required. Rake
33 setting mortar 1/4 inch and allow to dry. Tuck point raked joints and scored joints at same time.
- 34 F. Horizontal Reinforcing: Use in accordance with best practices for concrete block work and applicable
35 building codes.
- 36 G. Vertical Control Joints: Use in accordance with best practice for concrete block work.
- 37 H. Keep Glaze Clean: Wipe off all mortar smears and spatters at once, using clean, soft, damp rags. Do not
38 allow hardening.

39 **3.4 TOLERANCES**

- 40 A. Dimensions and Locations of Elements:
- 41 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4
42 inch.
- 43 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2
44 inch.
- 45 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus
46 1/4 inch in a story height or 1/2 inch total.
- 47 B. Lines and Levels:
- 48 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10
49 feet, or 1/2-inch maximum.
- 50 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level
51 by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
- 52 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in
53 20 feet, or 1/2-inch maximum.

- 1 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and
2 control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-
3 inch maximum.
4 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20
5 feet, or 1/2-inch maximum.
6 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10
7 feet, or 1/2-inch maximum.
8 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16
9 inch.
- 10 C. Joints:
11 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a
12 maximum thickness limited to 1/2 inch.
13 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8
14 inch.
15 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus
16 1/4 inch.
17 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

18 3.5 LAYING MASONRY WALLS

- 19 A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and
20 for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-
21 size units, particularly at corners, jambs, and, where possible, at other locations.
22 B. Lay concealed masonry with all units in a wythe in running bond. Bond and interlock each course of each
23 wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or
24 jambs.
25 C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course
26 below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove
27 loose masonry units and mortar, and wet brick if required before laying fresh masonry.
28 D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly
29 with masonry around built-in items.
30 E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
31 F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire
32 mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
33 1. Install compressible filler in joint between top of partition and underside of structure above.
34 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs
35 solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch
36 clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless
37 otherwise indicated.

38 3.6 MORTAR BEDDING AND JOINTING

- 39 A. Lay hollow CMUs as follows:
40 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
41 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
42 B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head
43 joints and shove into place. Do not deeply furrow bed joints or slush head joints.
44 C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness
45 unless otherwise indicated.

46 3.7 MASONRY-JOINT REINFORCEMENT

- 47 A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on
48 exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
49 1. Space reinforcement not more than 16 inches o.c.
50 2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12
51 inches beyond openings in addition to continuous reinforcement.
52 B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
53 C. Provide continuity at wall intersections by using prefabricated T-shaped units.
54 D. Provide continuity at corners by using prefabricated L-shaped units.
55 E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column
56 fireproofing, pipe enclosures, and other special conditions.

- 1 **3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE**
2 A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or
3 concrete, to comply with the following:
4 1. Anchor masonry with anchors embedded in masonry joints and attached to structure.
5 2. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c.
6 horizontally.

- 7 **3.9 REPAIRING, POINTING, AND CLEANING**
8 A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that
9 do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to
10 eliminate evidence of replacement.
11 B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with
12 mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform
13 appearance. Prepare joints for sealant application, where indicated.
14 C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and
15 smears before tooling joints.
16 D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
17 1. Cleaning Compound: Use masonry detergent cleaners such as Spectra® brand of cleaners, Vana-
18 trol® or Deox® in strict accordance with each manufacturer's directions. Do not use any product
19 containing unbuffered hydrochloric acid or other unbuffered acids.

- 20 **3.10 MASONRY WASTE DISPOSAL**
21 A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property.
22 At completion of unit masonry work, remove from Project site.
23 B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

24 **END OF SECTION**

25

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SECTION 04 22 00
REINFORCED UNIT MASONRY

- 1
- 2
- 3 PART 1 – GENERAL
- 4 1.1 SECTION INCLUDES
- 5 1.2 RELATED WORK
- 6 1.3 REFERENCES
- 7 1.4 QUALITY ASSURANCE
- 8 1.5 SUBMITTALS
- 9 1.6 MOCKUP
- 10 1.7 DELIVERY STORAGE AND HANDLING
- 11 PART 2 – PRODUCTS
- 12 2.1 MATERIALS
- 13 PART 3 – EXECUTION
- 14 3.1 EXAMINATION
- 15 3.2 PREPARATION
- 16 3.3 COLD WEATHER CONSTRUCTION
- 17 3.4 HOT WEATHER CONSTRUCTION
- 18 3.5 COURSING
- 19 3.6 PLACING AND BONDING
- 20 3.7 HORIZONTAL REINFORCEMENT AND ANCHORS
- 21 3.8 VERTICAL REINFORCEMENT
- 22 3.9 CONCRETE UNIT MASONRY
- 23 3.10 GROUTING REINFORCED CONCRETE BLOCK WALLS
- 24 3.11 GROUTING BLOCK CELLS BELOW LINTELS AND BEAMS
- 25 3.12 LINTELS AND BOND BEAMS
- 26 3.13 CONTROL AND EXPANSION JOINTS
- 27 3.14 BUILT-IN WORK AND EMBEDDED ITEMS
- 28 3.15 PREFABRICATED CONCRETE AND MASONRY ITEMS
- 29 3.16 TOLERANCES
- 30 3.17 CUTTING AND FITTING
- 31 3.18 CLEANING
- 32 3.19 PROTECTION OF FINISHED WORK

33 PART 1 - GENERAL

34 1.1 SECTION INCLUDES

- 35 A. Supply and installation of all reinforced concrete unit masonry work (concrete unit masonry, mortar,
36 grout, reinforcement, anchors, and ties) and accessories as shown on the drawings and herein
37 specified.
- 38 B. Products installed but not furnished under this section:
 - 39 1. Masonry.
 - 40 2. Cavity wall board insulation.
- 41 C. Structural notes indicated on the drawings regarding reinforced unit masonry shall be considered
42 part of this specification.

43 1.2 RELATED WORK

- 44 A. Section 03 30 00 - Cast-in-Place Concrete.
- 45 B. Section 04 20 00 - Unit Masonry.
- 46 C. Section 05 12 23 - Structural Steel.
- 47 D. Section 31 23 00 - Foundation Excavating and Backfilling.

1 **1.3 REFERENCES**

- 2 A. Codes and Standards: Comply with the provisions of the following codes, specifications, and
3 standards except where more stringent requirements are shown or specified. Where any provision
4 of other pertinent codes and standards conflict with this specification, the more stringent provision
5 shall govern.
- 6 1. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
7 2. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for
8 Concrete Reinforcement.
9 3. ASTM A641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
10 4. ASTM A951 - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
11 5. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
12 6. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
13 7. ASTM C387 - Specification for Packaged, Dry, Combined Materials for Concrete and High
14 Strength Mortar.
15 8. ASTM C476 - Standard Specification for Grout for Masonry.
16 9. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of
17 Mortars for Plain and Reinforced Unit Masonry.
18 10. ASTM C1019 - Standard Test Method for Sampling and Testing Grout.
19 11. International Masonry Industry All-Weather Council (IMIAC) - Recommended Practices and
20 Guide Specifications for Cold Weather Masonry Construction.
21 12. TMS 402/602 - Building Code Requirements and Specifications for Masonry Structures.
22 13. UL - Underwriters Laboratories.

23 **1.4 QUALITY ASSURANCE**

- 24 A. Installation Company: Company shall have not less than five (5) years of documented experience in
25 the construction of masonry projects of similar scope and complexity.
- 26 B. For the actual cutting and placing of concrete masonry units, use only skilled masons who are
27 thoroughly experienced with the material and methods specified and thoroughly familiar with the
28 design requirements. Workers shall have not less than three (3) years of documented experience in
29 the construction of masonry walls.
- 30 C. Fire Resistance: Whenever a fire-resistant classification is indicated for unit masonry construction,
31 provide concrete block units as tested and listed for the particular fire-resistant construction.

32 **1.5 SUBMITTALS**

- 33 A. Prepare and submit product data for Engineer's approval. Data should include all horizontal
34 reinforcement, anchoring devices, and all other embedded items herein specified.
- 35 B. Prepare and submit shop drawings detailing the fabrication, bending, and placement of reinforcing
36 bars.
- 37 C. Samples: When requested by the Architect and before any materials are delivered to Worksite,
38 submit for approval one sample of the proposed masonry materials, showing the full range of colors
39 and textures available.
- 40 D. Certificates:
- 41 1. Submit a letter of certification from the manufacturer of the concrete masonry units certifying
42 all concrete masonry units delivered to the worksite are in strict conformance with the
43 provisions of this specification.
- 44 2. Submit concrete unit masonry compressive strength test results demonstrating the units
45 meet the specified strength. Test must be conducted by a qualified independent testing
46 agency.

- 1 E. Submit mortar mix design and test results as follows:
- 2 1. Mix designs shall indicate type and proportions of ingredients in compliance with the
3 proportion requirements of ASTM C270.
- 4 2. For mix designs not in accordance with the proportion requirements of ASTM C270, the
5 mortar test history must be performed in accordance with ASTM C780 to verify performance
6 with property requirements of ASTM C270. Tests must meet the type of mortar specified on
7 the drawings. Tests must be done by a qualified independent testing agency.
- 8 F. Submit grout mix designs and test results as follows:
- 9 1. Mix designs shall indicate type and proportions of the ingredients in compliance with the
10 proportion requirements of ASTM C476.
- 11 2. For mix designs not in accordance with the proportion requirements of ASTM C476, the
12 grout test history must be performed in accordance with ASTM C1019 to verify performance
13 with property requirements of ASTM C476. Tests must meet the type of grout specified on
14 the drawings. Test must be done by a qualified independent testing agency.
- 15 a. Perform one test prior to construction and perform at least one test during
16 construction for each 5000 square feet of wall.

17 **1.6 DELIVERY, STORAGE, AND HANDLING**

- 18 A. All masonry units shall be delivered to worksite and stacked on pallets to allow the circulation of air
19 through all units. Cover with a waterproof covering anchored to prevent displacement during high
20 winds.
- 21 B. Masonry accessories, including reinforcing steel, shall be stored clear of the ground to prevent
22 deterioration or damage due to moisture, temperature changes, contaminants, and corrosion.
- 23 C. Deliver all materials in sufficient quantity and time to maintain approved construction schedule.
- 24 D. Deliver all packaged materials in manufacturer's original containers, with labels and markings intact
25 and legible.
- 26 E. Immediately remove all damaged materials or containers from site and replace with new items.

27 **PART 2 - PRODUCTS**

28 **2.1 MATERIALS**

- 29 A. Concrete Masonry Units: ASTM C90, Grade N-1 as follows:
- 30 1. Weight: Normal weight.
31 2. Compressive Strength: As indicated on the drawings.
32 3. Nominal Size: As indicated on the drawings.
33 4. Actual Size: 3/8" less than nominal size.
34 5. Aggregates:
35 a. Normal Weight: ASTM C33.
36 6. Provide special units for 90° corners, lintels jambs, sash, control joints, headers, bond
37 beams, and other special conditions conforming to ASTM C90.
38 7. All exposed unit masonry shall be free of chips, cracks, and other imperfections.
- 39 B. Concrete Brick Units: ASTM C55, as follows:
- 40 1. Weight: Normal weight.
41 2. Compressive Strength: As indicated on the drawings.
42 3. Nominal Size: As indicated on the drawings.

- 1 4. Actual Size: 3/8" less than nominal size.
2 5. Aggregates: Normal weight shall conform to ASTM C33.
- 3 C. Glazed Concrete Masonry Unit
- 4 1. Weight: Normal weight.
5 2. Compressive Strength: As indicated on the drawings.
6 3. Nominal Size: As indicated on the drawings.
7 4. Actual Size: 3/8" less than nominal size.
8 5. Aggregates: Normal weight shall conform to ASTM C33.
9 6. Provide special units for 90° corners, lintels jambs, sash, control joints, headers, bond
10 beams, and other special conditions conforming to ASTM C90.
11 7. All exposed unit masonry shall be free of chips, cracks, and other imperfections.
12 8. Color: DP Olive
13 9. Surface Burning Characteristics of Facing: ASTM E 84; flame spread less than 25; fuel
14 contribution 0; smoke density less than 50. Products of combustion considered non-toxic as
15 determined by BRC 4690 (toxicity testing)
16 10. Concrete Block for Glazing: ASTM C 90 for hollow and solid load-bearing units; Type 1
17 (moisture controlled).
- 18 D. Mortar and Grout:
- 19 1. Compressive Strength: As indicated on the drawings.
20 2. Mortar type for masonry construction shall be as designated in the General Notes of the
21 drawings, conforming to ASTM C270, and grout shall conform to ASTM C476.
22 3. Portland Cement: ASTM C150, Type I, non-staining, no air entraining, natural color cement.
23 4. Blended Cement: ASTM C595.
24 5. Masonry Cement: ASTM C91.
25 6. Mortar Aggregate: ASTM C144, standard masonry type.
26 7. Hydrated Lime: ASTM C207.
27 8. Quicklime: ASTM C5, non-hydraulic type.
28 9. Premix Mortar: ASTM C387, using gray cement, normal strength.
29 10. Grout Aggregate: ASTM C404.
30 11. Grout Fine Aggregate: Sand.
31 12. Water: Clean and potable.
32 13. Do not use calcium chloride in mortar or grout.
- 33 E. Joint Reinforcement:
- 34 1. Provide joint reinforcement formed from galvanized carbon-steel wire in accordance with
35 ASTM A641, Class 1 for interior walls; and ASTM A153, Class B-2, for exterior walls.
- 36 2. Provide welded wire units prefabricated with 9 gauge deformed continuous side rods and 9
37 gauge plain cross rods into straight lengths of not less than 10 feet with matching corner
38 and tee units. Unit widths to be 1-1/2 to 2 inches less than the wall thickness.
- 39 3. For multi-wythe concrete masonry walls, provide truss type reinforcement with a third side
40 rod extending out into the other wythe.
- 41 F. Ties and Anchors:
- 42 1. Rigid wall anchors shall be fabricated of 1/4 inch thick mild steel, 1 inch wide by 24 inches
43 long, with ends turned up.
- 44 2. Wall ties shall be corrugated 7/8 inch wide by 7 inches long, minimum 16 gauge galvanized
45 steel.
- 46 3. Structural steel column anchor ties shall be adjustable weld-on 1/4 inch diameter steel rods
47 and minimum 3/16 inch galvanized triangular shaped tie.

- 1 4. For anchorage to concrete, use dovetail sheet metal anchor sections and triangular shaped
2 16 gauge wire tie sections sized to extend within 1 inch of masonry face.
- 3 G. Reinforcement:
- 4 1. Use deformed billet bars with unprotected finish conforming to ASTM A615, 60 ksi yield
5 strength.
- 6 H. Control and Expansion Joints:
- 7 1. Control joint material for unit masonry shall consist of cross-shaped extruded polyvinyl
8 gaskets sized to match wall thickness.
- 9 2. Expansion or joint filler material, unless otherwise indicated, shall be 1/2 inch thick asphalt
10 impregnated cellular board.
- 11 3. Compressible filler shall be pre-molded filler strips complying with ASTM D1056, Type 2,
12 Class A, Grade 1; compressible up to 35 percent of width and thickness indicated.
- 13 4. Bond breaker strips shall be asphalt-saturated, organic roofing felt complying with ASTM
14 D226, Type I (No. 15 asphalt felt).

15 **PART 3 - EXECUTION**

16 **3.1 EXAMINATION**

- 17 A. Verify that field conditions are acceptable and are ready to receive work.
- 18 1. Verify foundations are constructed with tolerances conforming to the requirements of ACI
19 117.
- 20 2. Verify reinforcing dowels are positioned in accordance with the drawings.
- 21 B. Verify items provided by other Sections of work are properly sized and located.
- 22 C. Verify built-in items are in proper location and ready for roughing into masonry work.
- 23 D. Beginning of installation means Installer accepts existing conditions.

24 **3.2 PREPARATION**

- 25 A. Layout walls in advance for accurate spacing of bond patterns, with uniform joint widths and to
26 properly locate openings, expansion joints, and offsets.
- 27 B. Direct and coordinate placement of metal anchors supplied to other Sections.
- 28 C. The Contractor is responsible to design, provide, and install bracing that will ensure stability of
29 masonry during construction. Maintain in place until building structure provides permanent bracing.
- 30 D. Remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to the
31 foundation.
- 32 E. Clean all reinforcement by removing mud, oil, or other materials that will adversely affect or reduce
33 bond at the time mortar or grout is placed.

34 **3.3 COLD WEATHER CONSTRUCTION**

- 35 A. When ambient temperature is below 40°F, implement cold weather procedures.

- 1 B. Special cold weather requirements for various temperature ranges are as follows:
- 2 1. Air temperature 40°F to 32°F: Sand or mixing water shall be heated to produce mortar
3 temperatures between 40°F to 120°F.
- 4 2. Air temperature 32°F to 25°F:
- 5 a. Sand and mixing water shall be heated to produce mortar temperatures between
6 40°F to 120°F. Maintain temperature of mortar on boards above freezing.
- 7 b. Grout aggregates and mixing water shall be heated to produce grout temperature
8 between 70°F to 120°F.
- 9 3. Air temperature 25°F to 20°F: Comply with requirements for air temperature between 32°F
10 to 25°F and the following:
- 11 a. Provide heat sources on both sides of the wall under construction to heat masonry
12 surfaces to 40°F. Windbreaks shall be used when wind is excess of 15 miles per
13 hour.
- 14 b. Heat masonry to a minimum temperature of 40°F prior to grouting.
- 15 4. Air temperature 20°F and below. Comply with requirements for air temperature between
16 32°F to 20°F and the following:
- 17 a. Enclosure and auxiliary heat shall be provided to maintain air temperature above
18 freezing. Do not lay masonry units having a temperature below 20°F.
- 19 C. Cold-Weather Protection:
- 20 1. When the mean daily air temperature is 40°F to 25°F, masonry shall be completely covered
21 for 24 hours with weather-resistive membrane.
- 22 2. When the mean daily air temperature is 25°F to 20°F, masonry shall be completely covered
23 for 24 hours with insulating blankets with a weather-resistive covering. Extend time period
24 to 48 hours for grouted masonry.
- 25 3. When the mean daily air temperature is 20°F or below, masonry temperature shall be
26 maintained above freezing for 24 hours by enclosure and auxiliary heating. Extend time
27 period to 48 hours for grouted masonry.
- 28 D. Do not lay masonry units having either a temperature below 20°F or containing frozen moisture,
29 visible ice, or snow on their surfaces.
- 30 E. Remove visible ice and snow from the top surface of existing foundations and masonry to receive
31 new construction. Heat these surfaces above freezing.
- 32 F. Top of all walls not enclosed or sheltered shall be covered with strong weather-resistive material at
33 the end of each day or shutdown.
- 34 G. Partially completed walls shall be covered at all times when work is not in progress.
- 35 H. Any section of masonry deemed frozen and damaged shall be removed before continuing
36 construction of that section.
- 37 I. Masonry units shall be dry at the time of placement. Wet or frozen units shall not be laid.

1 **3.4 HOT WEATHER CONSTRUCTION**

2 A. Hot weather construction is defined when:

3 1. The ambient air temperature exceeds 100°F or exceeds 90°F with a wind velocity greater
4 than 8 mph.

5 B. Hot Weather Procedures:

6 1. Maintain sand piles in a damp, loose condition.

7 2. Provide necessary conditions and equipment to produce mortar having a temperature below
8 120°F.

9 3. Flush mixer, mortar transport container, and mortar boards with cool water before they come
10 in contact with mortar ingredients or mortar.

11 4. Use mortar within two hours of initial mixing.

12 5. Fog spray all newly constructed masonry until damp, at least three times a day until the
13 masonry is three days old.

14 6. Do not spread mortar beds more than 4' ahead of masonry. Set masonry within one minute
15 of spreading mortar.

16 **3.5 COURSING**

17 A. Establish lines, levels, and coursing indicated. Protect from displacement. Grouted cells shall be in
18 vertical alignment.

19 B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform
20 thickness.

21 C. Lay concrete masonry units in bond to match existing at all patch and infill locations.

22 D. Unless noted otherwise, provide masonry control joints at 30'-0" on center maximum.

23 E. Unless noted otherwise, build non-bearing interior partitions walls full height to underside of structure.

24 **3.6 PLACING AND BONDING**

25 A. Unless noted otherwise, construct masonry in running bond pattern.

26 B. Lay hollow masonry units with face shell bedding on head and bed joints.

27 C. Bed and Head Joints:

28 1. Unless otherwise required, construct 3/8 inch thick bed and head joints.

29 2. At foundation, construct bed joint of the starting course a thickness not less than 1/4 inch,
30 and not more than 3/4 inch.

31 3. Unless otherwise noted, tool joint with a round jointer when the mortar is thumbprint hard.

32 4. Remove masonry protrusions extending 1/2 inch or more into cells or cavities to be grouted.

33 5. Where masonry rests on concrete, the concrete shall be sandblasted or bushed.

- 1 D. Collar Joints:
- 2 1. Unless otherwise required, solidly fill collar joints less than 3/4 inch wide with mortar as the
3 job progresses.
- 4 E. Place hollow units as follows:
- 5 1. With face shells of bed joints fully mortared.
- 6 2. With webs fully mortared in:
- 7 a. All courses of piers columns and pilasters.
8 b. In the starting course on foundations.
9 c. When necessary to confine grout or loose fill.
10 d. When otherwise required.
- 11 3. With head joints mortared, a minimum distance from each face equal to the face shell
12 thickness of the unit.
- 13 4. Vertical cells to be grouted are aligned and openings are unobstructed.
- 14 F. Place solid units as follows:
- 15 1. Unless otherwise required, solidly fill bed and head joints with mortar.
16 2. Do not fill head joints by grouting with mortar.
17 3. Construct head by shoving mortar tight against the adjoining unit.
18 4. Do not deeply furrow bed joints.
- 19 G. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- 20 H. Remove excess mortar as work progresses.
- 21 I. Interlock intersections and external corners.
- 22 J. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be
23 made, remove mortar and replace.
- 24 K. Perform job site cutting of masonry units with proper tools to provide straight, clean, undamaged
25 edges. Prevent broken masonry unit corners or edges.
- 26 L. Isolate masonry partitions from vertical structural framing members with a control joint.
- 27 M. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks
28 with compressible joint filler and pin top of wall with prefabricated partition anchors that allow vertical
29 movement.
- 30 **3.7 HORIZONTAL REINFORCEMENT AND ANCHORS**
- 31 A. Install horizontal joint reinforcement as follows:
- 32 1. Interior non-load bearing walls - 24 inches on center vertically.
33 2. Exterior walls and interior load bearing walls - 16 inches on center vertically.
34 3. Parapet walls - 8 inches on center vertically unless noted otherwise.
35 4. Foundation walls - 8 inches on center vertically unless noted otherwise.
- 36 B. Place masonry joint reinforcement in first and second horizontal joints above and below openings.
37 Extend minimum 16 inches each side of opening.
- 38 C. Place joint reinforcement continuous in first and second joint below top of walls.
- 39 D. Lap joint reinforcement ends minimum 6 inches. Extend minimum 16 inches each side of openings.

- 1 E. Place joint reinforcement so longitudinal wires are embedded in mortar with a minimum cover of 1/2
2 inch when not exposed to weather or earth, and 5/8 inch when exposed to weather or earth.
- 3 F. Anchor masonry to structural members where masonry abuts or faces such members.
- 4 G. Wall Ties:
- 5 1. Embed the ends of wall ties in mortar joints. Embed wall tie ends at least 1/2" into the outer
6 face shell of hollow units. Embed wire wall ties at least 1-1/2" into the mortar bed of solid
7 masonry units or solid grouted hollow units.
- 8 2. Do not bend wall ties after embedded in grout or mortar.
- 9 3. Unless otherwise required, install adjustable ties in accordance with the following
10 requirements.
- 11 a. One tie for each 1.77 square feet of wall area.
- 12 b. Do not exceed 16 inches horizontal or vertical spacing.
- 13 c. The maximum misalignment of bed joints from one wythe to the other is 1-1/4".
- 14 d. The maximum clearance between connecting parts of the ties is 1/16".
- 15 e. When pintle legs are used, provide ties with at least two legs made of wire size
16 W2.8.
- 17 f. Install wire ties perpendicular to a vertical line on the face of the wythe from which
18 they protrude. Where one-piece ties or joint reinforcement is used, the bed joints
19 of adjacent wythes shall align.
- 20 g. Unless otherwise required, provide additional unit ties around all openings larger
21 than 16 inches in either dimension. Space ties around perimeter of opening at a
22 maximum of 3 feet on center. Place ties within 12 inches of opening.
- 23 H. Veneer Anchors:
- 24 1. Embed veneer anchors in mortar joint and extend into the veneer a minimum of 1-1/2 inch
25 at least 5/8-inch cover to the outside face.
- 26 2. Install adjustable veneer anchors as follows:
- 27 a. The maximum misalignment of bed joints from one wythe to the other is 1-1/4 inch.
- 28 b. The maximum clearance between connecting parts of the ties is 1/16 inch.
- 29 c. When pintle legs are used, provide anchors with at least two legs made of wire
30 size W2.8.
- 31 d. Provide at least one adjustable two-piece anchor of wire size W1.7 or 22 gauge
32 corrugated sheet metal anchor for each 2.67 square feet of wall area.
- 33 3. Install non-adjustable veneer anchors for each 3.5 square feet of wall area.
- 34 4. Space anchors at a maximum of 32 inches horizontally and 16 inches vertically.
- 35 5. Provide additional anchors around all openings larger than 16 inches in either dimension.
36 Space anchors around the perimeter of opening at a maximum of 3 feet on center. Place
37 anchors within 12 inches of the opening.

1 **3.8 VERTICAL REINFORCEMENT**

- 2 A. Support and secure reinforcing bars from displacement beyond the tolerances allowed by
3 construction loads or by placement of grout or mortar. Maintain position within 1/2 inch of masonry
4 unit or formed surface, but not less than 1/4 inch (only when fine grout is used).
- 5 B. Dowels in footings shall be set to align with cores containing reinforcing steel.
- 6 C. Place and consolidate grout fill without displacing reinforcing. Completely embed reinforcing bars in
7 grout.
- 8 D. All cells containing reinforcing in concrete blocks shall be filled solid with grout.
- 9 E. Do not bend reinforcement after it is embedded in grout or mortar.
- 10 F. Reinforce masonry unit cores and cavities with vertical reinforcement bars and grout as indicated on
11 drawings. Place reinforcement and ties in grout spaces prior to grouting.
- 12 G. Retain vertical reinforcement in position at top and bottom of cells and at intervals not exceeding 192
13 bar diameters.
- 14 H. Place steel in walls and flexural elements within 1/2 inch of required location.
- 15 I. Place vertical bars within 2 inches of the required location along the length of the wall.

16 **3.9 CONCRETE UNIT MASONRY**

- 17 A. Lay masonry units with core cells vertically aligned and clear of mortar dropping, debris, loose
18 aggregates, and any material deleterious to masonry grout.
- 19 B. Do not place grout until height of masonry to be grouted has attained sufficient strength to resist grout
20 pressure.
- 21 C. Do not wet concrete masonry units before laying.
- 22 D. Grout spaces less than two inches in width with fine grout using low lift grouting techniques. Grout
23 spaces two inches or greater in width with course grout using high lift or low lift grouting techniques.
- 24 E. When grouting is stopped for more than one hour, terminate grout 1-1/2 inch below top of upper
25 masonry unit to form a positive key for subsequent grout placement.
- 26 F. Grouting:
 - 27 1. Place grout in lifts not to exceed five feet. Consolidate grout at time of placement.
 - 28 a. Consolidate grout pours 12 inches or less in height by mechanical vibration or by
29 puddling.
 - 30 b. Consolidate grout pours exceeding 12 inches in height by mechanical vibration
31 and reconsolidate by mechanical vibration after initial water loss and settlement
32 has occurred.
 - 33 2. When the grout pour height exceeds 5 feet 4 inches, provide cleanout opening no less than
34 3 inches high at the bottom of each cell to be grouted by cutting one face shell of masonry
35 unit. Opening should be sufficient size to permit removal of debris.
 - 36 3. Pump grout into spaces. Maintain water content in grout to intended slump without
37 aggregate segregation.
 - 38 4. Limit grout lift to 60 inches and rod for grout consolidation. Wait 30 to 60 minutes before
39 placing next lift.

1 **3.10 GROUTING REINFORCED CONCRETE BLOCK WALLS**

2 A. Provide reinforcing bars at indicated spacing and grout bars and voids solid with grout having a 28-
3 day compressive strength as listed in the General Notes of the drawings.

4 **3.11 GROUTING BLOCK CELLS BELOW LINTELS AND BEAMS**

5 A. For lintel spans greater than 5'-0": Grout block cells 24 inches beneath the lintel and 24 inches each
6 side of lintel.

7 **3.12 LINTELS AND BOND BEAMS**

8 A. Steel Lintels: Install steel lintel supplied from Division 5 of this specification. Provide a minimum of 8
9 inches of end bearing on each side of opening unless noted otherwise. All exterior exposed steel
10 lintels shall be hot-dip galvanized in accordance with ASTM A123.

11 B. Bond Beams:

12 1. Use specially shaped lintel units at hollow masonry unit walls, with reinforcing bars as shown
13 and filled with concrete grout.

14 2. Provide minimum 8 inches of end bearing at each side of opening.

15 3. Provide reinforced concrete block lintels over openings less than 3'-0" wide which are not
16 scheduled.

17 4. Place and consolidate concrete without disturbing the reinforcing.

18 5. Allow lintels to reach 100 percent of their design strength before removing temporary
19 supports.

20 6. Do not place vertical control joints above bond beams or within 8 inches each side of bond
21 beam.

22 **3.13 CONTROL AND EXPANSION JOINTS**

23 A. Do not continue horizontal joint reinforcement through control and expansion joints except above wall
24 openings.

25 B. Provide vertical expansion, control, and isolation joints as indicated on the drawings. If joints are not
26 indicated, then provide control joints at a maximum spacing of 30'-0".

27 C. Install all built-in masonry accessory items as work progresses.

28 D. Exposed joints to be tooled slightly concave and concealed joints to be struck flush. Use a 3/4-inch
29 diameter round tool for making 1/2-inch joints.

30 1. Bed Joints: Not less than 3/8-inch and not more than 2-inch thick.

31 2. Head Joints: To match bed joints.

32 E. Rake out mortar where sealants are shown or required.

33 **3.14 BUILT-IN WORK AND EMBEDDED ITEMS**

34 A. As work progresses, build in metal door and glazed frames, fabricated metal lintels, anchor bolts,
35 plates, and other items furnished by other Sections.

36 B. Place pipes and conduits passing horizontally through masonry beams or masonry walls in steel
37 sleeves or cored holes.

38 C. Install pipes and conduits passing horizontally through non-bearing masonry partitions.

- 1 D. Install and secure connectors, flashing, weep holes, weep vents, nailing blocks, and other
2 accessories.
- 3 E. Do not embed aluminum conduits, pipes, and accessories in masonry, grout, or mortar, unless
4 effectively coated or covered to prevent aluminum-cement chemical reaction or electrolytic action
5 between aluminum and steel.
- 6 F. Build in items plumb and level.
- 7 G. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with
8 grout.
- 9 H. Do not build in organic materials subject to deterioration.

10 **3.15 PREFABRICATED CONCRETE AND MASONRY ITEMS**

- 11 A. Erect prefabricated concrete and masonry items in accordance with the requirements.

12 **3.16 TOLERANCES**

- 13 A. Comply with tolerances in the MSJC Specification and the following:
- 14 1. Maximum variation from alignment of columns and pilasters: 1/4 inch.
- 15 2. Maximum variation from unit to adjacent unit: 1/32 inch.
- 16 3. Maximum variation from plane of wall: 1/4 inch in 10 feet and 3/8 inch in 20 feet or more.
- 17 4. Maximum variation from plumb: 1/4 inch per story non-cumulative.
- 18 5. Maximum variation from level coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in
19 30 feet.
- 20 6. Maximum variation of bed joint thickness: 1/8 inch.

21 **3.17 CUTTING AND FITTING**

- 22 A. Cut and fit for chases, pipes, conduit, sleeves, and structural members. Coordinate with other
23 Sections of work to provide correct size, shape, and location.
- 24 B. Obtain the Engineer's approval prior to cutting or fitting masonry work not indicated or where
25 appearance or strength of masonry work may be impaired.

26 **3.18 CLEANING**

- 27 A. Remove excess mortar and mortar smears.
- 28 B. Replace defective mortar.
- 29 C. Clean soiled surfaces with cleaning solution.
- 30 D. Use non-metallic tools in cleaning operations.
- 31 E. Clean exposed masonry surfaces of all stains, efflorescence, mortar or grout droppings, and debris.
- 32 F. Where new masonry wall surfaces remain stained or defaced by mortar or any other foreign matter
33 to a degree not acceptable to the Owner, clean surfaces by a light sandblasting at no added cost.
34 Avoid damaging masonry surfaces and joints during sandblasting operations.

1 **3.19 PROTECTION OF FINISHED WORK**

2 A. Without damaging completed work, provide protective boards at exposed external corners that may
3 be damaged by construction activities.

4 B. Water Repellent Coating:

5 1. Apply sufficient coats of the approved material to achieve a consistent and uniform
6 appearance, free from runs and sags, and with a uniformly resistive surface that will prevent
7 penetration of water through the walls for the required period of warranty.

8 2. Twenty days after completion of the portion of the Work, and as a condition of its
9 acceptance, demonstrate by running a water test showing it will successfully repel water.

10 a. Notify the Engineer at least 72 hours in advance, and conduct the test in the
11 Engineer's presence.

12 b. By means of an outrigger or similar acceptable equipment, place the nozzle of a
13 3/4" garden hose at a point approximately 10 feet away from the top of the wall,
14 aiming the nozzle at a slight downward angle to direct the full stream of water onto
15 the wall.

16 c. Run the water onto the wall at full available force for not less than 4 hours.

17 d. Upon completion of the 4-hour period, inspect the interior surfaces of the wall for
18 evidence of moisture penetration.

19 3. If evidence of moisture penetration is discovered, apply an additional coat of the water
20 repellent material to the exterior surface in areas directed by the Engineer, repeating the
21 application and the testing, at no additional cost to the Owner, until no evidence of moisture
22 penetration is found.

23 **END OF SECTION**

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SECTION 05 12 13

ARCHITECTURALLY EXPOSED STEEL FRAMING

PART 1 – GENERAL

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- 1.5 [PREINSTALLATION MEETINGS](#)
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- 3.1 [EXAMINATION](#)
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- 3.3 [ERECTION](#)
- 3.4 [FIELD CONNECTIONS](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Architecturally exposed non-structural steel for vendor stall canopy/framing.
 - 2. Section 05 12 00 "Structural Steel Framing" requirements that also apply to this section.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 05 45 00 "Equipment Support Systems" for slotted channel grid suspended from architecturally exposed steel framing.
 - 3. Section 05 75 00 "Decorative Formed Metal" for vendor stall canopy panels.
 - 4. Section 09 51 13 "Acoustical Panel Ceilings" for vendor stall canopy panels.
 - 5. Section 09 91 23 "Interior Painting" for finish painting requirements.

1.3 DEFINITIONS

- A. AESS: Architecturally exposed structural steel.
- B. Category AESS 2: Structural steel that is categorized by ANSI/AISC 303, Section 10, as AESS 2 and may be designated AESS 2 or Category AESS 2 in the Contract Documents.

1.4 COORDINATION

- A. Coordinate surface preparation requirements for field painted items.

1.5 PREINSTALLATION MEETINGS

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

1.6 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication of AESS components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Indicate orientation of mill marks and HSS seams.

- 1 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show
- 2 size, length, and type of each weld. Indicate grinding, finish, and profile of welds.
- 3 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify
- 4 pretensioned and slip-critical, high-strength bolted connections. Indicate orientation and location of
- 5 bolt heads.
- 6 5. Indicate exposed surfaces and edges and surface preparation being used.
- 7 6. Indicate special tolerances and erection requirements.
- 8 7. Indicate surface preparation, primer, and coating requirements, including systems specified in other
- 9 Sections.

10 **1.7 INFORMATIONAL SUBMITTALS**

- 11 A. Qualification Data: For Installer.

12 **1.8 QUALITY ASSURANCE**

- 13 A. Mockups: Build assembly mockups of AESS and elements supported to set quality standards for
- 14 fabrication and installation of entire assembly.
- 15 1. Build mockup of typical portion of complete composite vendor stall canopy as shown on Drawings.
 - 16 Provide supporting steel grid.
 - 17 2. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete
 - 18 a mockup submittal for review.
 - 19 3. Subject to compliance with requirements, approved mockups may become part of the completed
 - 20 Work if undisturbed at time of Substantial Completion.

21 **1.9 DELIVERY, STORAGE, AND HANDLING**

- 22 A. Use special care in handling AESS to prevent twisting, warping, nicking, and other damage during
- 23 fabrication, delivery, and erection. Store materials to permit easy access for inspection and identification.
- 24 Keep AESS members off ground and spaced by using pallets, dunnage, or other supports and spacers.
- 25 Protect AESS members and packaged materials from corrosion and deterioration.
- 26 1. Do not store AESS materials on structure in a manner that might cause distortion, damage, or
 - 27 overload to members or supporting structures. Repair or replace damaged materials or structures
 - 28 as directed.

29 **1.10 FIELD CONDITIONS**

- 30 A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions
- 31 by field measurements before fabrication.

32 **PART 2 - PRODUCTS**

33 **2.1 PERFORMANCE REQUIREMENTS**

- 34 A. Comply with requirements of ANSI/AISC 303, Sections 1 through 9 and as modified in Section 10,
- 35 "Architecturally Exposed Structural Steel."

36 **2.2 SURFACE PREPARATION**

- 37 A. Materials and Finish: Material and finish specifications as follows:
- 38 1. Finish: Shop markings, laser etching, labeling, rust, scale, etc shall be removed prior to the
 - 39 application of the finish.
 - 40 2. Refer to Section 09 91 23 – Interior Painting for field finish scheduled for PT-7.
 - 41 a. Cleaning & Prepping: Permalac NT Blackener is a thin, transparent coating. Darkening will
 - 42 build with each successive coat. Permalac NT Blackener can be applied directly to steel
 - 43 without a primer or undercoat. Mill scale and flash rust will not interfere with adhesion and
 - 44 sealing. Remove mill oil. Provide SSPC SP-2 – Hand Tool Cleaning at a minimum.

45 **2.3 FABRICATION**

- 46 A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed
- 47 locations if possible. Detail assemblies to minimize handling and to expedite erection.
- 48 1. Use special care handling and fabricating AESS before and after shop painting to minimize
 - 49 damage to shop finish.

- 50 A. Category AESS 2:

- 1 1. Comply with overall profile dimensions of AWS D1.1/D1.1M for welded built-up members. Keep
2 appearance and quality of welds consistent. Maintain true alignment of members without warp
3 exceeding specified tolerances.
- 4 2. Prepare surfaces according to Part 2 "Shop Priming" Article and SSPC-SP 6 (WAB)/NACE WAB-3.
- 5 3. Grind sheared, punched, and flame-cut edges to remove burrs and provide smooth surfaces and
6 eased edges.
- 7 4. Make intermittent welds appear continuous, using filler or additional welding.
- 8 5. Seal weld open ends of hollow structural sections with 3/8-inch (9.5-mm) closure plates.
- 9 6. Limit butt and plug weld projections to 1/16 inch (1.6 mm).
- 10 7. Install bolt heads on the same side of each connection and maintain orientation consistently from
11 one connection to another.
- 12 8. Remove weld spatter, slivers, and similar surface discontinuities.
- 13 9. Remove blemishes and surface irregularities resulting from temporary braces or fixtures by filling or
14 grinding, before cleaning, treating, and shop priming.
- 15 10. Grind tack welds smooth unless incorporated into final welds.
- 16 11. Remove backing and runoff tabs, and grind welds smooth.
- 17 12. Limit as-fabricated straightness tolerance to one-half that permitted for structural-steel materials in
18 ANSI/AISC 303.
- 19 13. Limit as-fabricated curved structural steel tolerance to that permitted for structural-steel materials in
20 ANSI/AISC 303.
- 21 14. Limit as-fabricated straightness tolerance of welded built-up members to one-half that permitted by
22 AWS D1.1/D1.1M.
- 23 15. Conceal fabrication and erection markings from view in the completed structure.
- 24 16. Make welds uniform and smooth.

25 **2.4 SHOP CONNECTIONS**

- 26 A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural
27 Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
- 28 1. Joint Type: Snug tightened.
- 29 B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure
30 specifications, weld quality, and methods used in correcting welding work.

31 **PART 3 - EXECUTION**

32 **3.1 EXAMINATION**

- 33 A. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.
- 34 B. Proceed with installation only after unsatisfactory conditions have been corrected.

35 **3.2 PREPARATION**

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

40 **3.3 ERECTION**

- 41 A. Take special care during erection to avoid marking or distorting the AESS and to minimize damage to shop
42 painting. Set AESS accurately in locations and to elevations indicated and according to ANSI/AISC 303
43 and ANSI/AISC 360.
- 44 1. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that
45 are exposed to view in the completed Work. Take care to avoid any blemishes, holes, or unsightly
46 surfaces resulting from the use or removal of temporary elements.
- 47 2. Grind tack welds smooth.
- 48 3. Remove backing and runoff tabs, and grind welds smooth.
- 49 4. Orient bolt heads on the same side of each connection and maintain orientation consistently from
50 one connection to another.
- 51 5. Conceal fabrication and erection markings from view in the completed structure.
- 52 B. In addition to ANSI/AISC 303, Section 10 requirements, comply with the following.
- 53 1. Erection of Category AESS 1:
54 a. Erect AESS to the standard frame tolerances specified in ANSI/AISC 303 for non-AESS.

- 1 b. Comply with AWS D1.1/D1.1M. Keep appearance and quality of welds consistent. Maintain
- 2 true alignment of members without warp exceeding specified tolerances.
- 3 c. Remove weld spatter, slivers, and similar surface discontinuities.
- 4 d. Grind off butt and plug weld projections larger than 1/16 inch.
- 5 e. Continuous welds shall be of uniform size and profile.
- 6 f. Ream holes that must be enlarged. Use of drift pins or burning is not permitted. Replace
- 7 misaligned connection plates where holes cannot be aligned with acceptable appearance.
- 8 g. Splice members only where indicated on Drawings.
- 9 h. No torch cutting or field fabrication is permitted.
- 10 2. Erection of Category AESS 3:

11 **3.4 FIELD CONNECTIONS**

- 12 A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints
- 13 Using High-Strength Bolts" for type of bolt and type of joint specified.
- 14 1. Joint Type: Snug tightened.
- 15 B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure
- 16 specifications, weld quality, and methods used in correcting welding work.

17 **END OF SECTION**

**SECTION 05 12 23
STRUCTURAL STEEL**

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- 2
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- 5 1.2 RELATED WORK
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- 17 3.4 REPAIRS PROTECTION AND TOUCH UP
- 18 3.5 GROUTING
- 19 3.6 MISCELLANEOUS STEEL AND STEEL LINTELS

20 **PART 1 - GENERAL**

21 **1.1 SECTION INCLUDES**

- 22 A. Fabrication and erection of structural steel work, as shown on the drawings and specified herein.
- 23 Work shall include, but not be limited to the following items:
 - 24 1. Structural steel
 - 25 2. Base and bearing plates.
 - 26 3. Deck support angles and framing for roof openings.
 - 27 4. Steel lintel members for masonry openings.
 - 28 5. Edge angles and bent plates.
 - 29 6. Connection plates.
 - 30 7. Shear stud connectors.
 - 31 8. All other steel items as listed in AISC – “Code of Standard Practice for Steel Buildings and
 - 32 Bridges” as shown on structural and architectural drawings.
- 33 B. Work shall also include grouting of all structural steel members where indicated.
- 34 C. Structural notes indicated on the drawings regarding structural steel framing should be considered a
- 35 part of this specification.

36 **1.2 RELATED WORK**

- 37 A. Pertinent Sections of Division 01.
- 38 B. Section 03 30 00 - Cast-in-Place Concrete.
- 39 C. Section 05 12 13 - Architecturally Exposed Structural Steel Framing.
- 40 D. Section 05 31 00 - Steel Deck.
- 41 E. Section 05 40 00 - Cold-Formed Steel Framing Systems.
- 42 F. Section 05 50 00 - Metal Fabrications.
- 43 G. Section 05 51 00 - Metal Stairs.

44 **1.3 REFERENCES**

- 45 A. Codes and Standards: Comply with the provisions of the following codes, specifications, and
- 46 standards except where more stringent requirements are shown or specified. Where any provisions
- 47 of other pertinent codes and standards conflict with this specification, the more stringent provision
- 48 shall govern.

1. AISC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
2. AISC 303 - Code of Standard Practice for Buildings and Bridges.
3. AISC 360-05 - Specification for Structural Steel Buildings.
4. ASTM A6 - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
5. ASTM A36 - Standard Specification for Carbon Structural Steel.
6. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
7. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
8. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
9. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
10. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
11. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
12. ASTM A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use.
13. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
14. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
15. ASTM A572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
16. ASTM A992 - Standard Specification for Steel for Structural Steel Shapes.
17. ASTM A1085 - Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS).
18. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
19. ASTM E94 - Standard Guide to Radiographic Examination Using Industrial Radiographic Film.
20. ASTM E165 - Standard Practice for Liquid Penetrant Examination for General Industry.
21. ASTM E709 - Standard Guide for Magnetic Particle Testing.
22. ASTM F436 - Standard Specification for Hardened Steel Washers.
23. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
24. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
25. ASTM F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength, Inch Dimensions.
26. AWS D1.1 - Structural Welding Code - Steel.
27. SSPC - Steel Structures Painting Council.

1.4 QUALITY ASSURANCE

- A. Fabrication, Erection, and Welding Qualifications:
1. Fabricate structural steel members in accordance with AISC Specification for the design, fabrication and erection of structural steel for buildings.
 2. Steel fabricator shall not have less than five (5) years of continuous experience in fabrication of structural steel framing.
 3. Steel erector shall not have less than five (5) years of continuous experience in the erection of structural steel framing.
 4. All welding of structural steel shall be performed by operators who have been recently qualified as prescribed in "Qualification Procedures" of the American Welding Society (AWS). Refer to Section 05 05 23.
 5. Tolerances: Tolerances shall be as indicated by the AISC Code of Standard Practice for Buildings and Bridges, except that tolerances for fabricating, rolling, cambering and erection shall not be cumulative.

1 **1.5 SUBMITTALS**

2 A. Shop Drawings:

3 1. Prepare and submit complete erection and detailed shop drawings for Engineer's approval,
4 including framing plans indicating size, weight and location of all structural members. Shop
5 drawings shall indicate methods of connecting, anchoring, fastening, bracing and attaching
6 work of other trades.

7 a. Where contract documents indicate verify in field (VIF) dimensions, shop drawings
8 shall indicate these dimensions and Contractor shall note that the dimensions have
9 been verified.

10 b. This specification modifies AISC Code of Standard Practice by deleting the
11 following sentence from 4.4.1(c): "Release by the Owner's Designated
12 Representatives for Design and Construction for the Fabricator to begin fabrication
13 using the approved submittals." Review of the shop drawings by the Engineer shall
14 not relieve the fabricator of this responsibility.

15 2. Furnish both the Engineer and Architect with one copy of the following:

- 16 a. Final shop drawings containing all review notations.
17 b. Field Use/For Construction drawings.

18 3. The steel fabricator shall submit a setting plan for all embedded items for Engineer's
19 approval.

20 4. Welder's Certification: Submit certification for all welders employed on the project
21 demonstrating they have been AWS qualified to perform the welding procedures required
22 for this project.

23 5. General Contractor/Construction Manager to provide copies of field concrete cylinder
24 breaks indicating the concrete meets 75% of the design compressive strength to the steel
25 erector.

26 B. The General Contractor shall conduct a field survey of as-built anchors and bearing plate locations
27 and elevations prior to steel erection. Survey shall be furnished to the steel fabricator. Contractor
28 shall identify deviations from approved shop drawings and submit proposed repairs and modifications
29 to the Engineer and steel fabricator for approval.

30 C. Product Data:

31 1. Certified copies of material test reports, commonly called mill test reports, for all structural
32 steel used on the project. Material test reports shall comply with the requirements of ASTM
33 A6, shall cover chemical and physical properties, and shall be accompanied by a Certificate
34 of Compliance from the fabricator.

35 2. Manufacturer specifications, certifications, and installation recommendations for the
36 following products, including laboratory test reports and other data required to prove
37 compliance with these specifications:

- 38 a. High strength bolts, including nuts and washers.
39 b. Unfinished bolts and nuts

40 3. The Contractor shall submit written procedures for the pre-installation testing, installation,
41 snugging, pretensioning, and post-installation inspection of fasteners. The procedure(s)
42 shall meet all requirements of the RCSC specification and the drawings. Procedures need
43 to be submitted only for the method(s) of installation to be used by the Contractor, which
44 may include the turn-of-nut, calibrated wrench, twist-off type tension control bolt, and direct
45 tension indicator methods.

- 1 4. Prepare and submit product data for Engineer's approval for shop applied primers, finished
2 paint system, expansion and/or adhesive anchors, non-shrink grout and other
3 miscellaneous materials.

4 **1.6 DELIVERY, STORAGE AND HANDLING**

- 5 A. Steel members shall be transported, stored and erected in a manner that will avoid any damage or
6 deformation. Materials should be stored to allow easy access for inspection and identification. Bent
7 or deformed members will be rejected and shall be replaced or repaired at the expense of the
8 responsible party. Store clear of the ground and in such a manner as to eliminate excessive handling.
- 9 B. Store fasteners in a protected location. Clean and re-lubricate bolts and nuts before use.

10 **PART 2 - PRODUCTS**

11 **2.1 MATERIALS**

12 A. Structural Steel:

- 13 1. All structural steel shall be free from defects impairing strength, durability or appearance.
14 All structural steel shall meet the latest minimum requirements as follows:

15 a. Structural steel wide flange shapes shall:

- 16 1) Conform to the ASTM designations listed in the General Notes of the
17 drawings, unless noted otherwise.

18 b. Structural steel angles, channels, bars, plates, and miscellaneous shall conform to
19 the ASTM designations listed in the General Notes of the drawings.

- 20 1) Shapes of ASTM A572, Grade 50, mill certified to AISC Technical Bulletin
21 #3 requirements, may be substituted for A992 with approval from the
22 Structural Engineer of Record (SEOR).

- 23 2) Grade 50 steel shall have a minimum yield stress of 50 ksi and the yield
24 stress, F_y , that is reported from tests shall be based on the yield strength
25 definition in ASTM A370, using the offset method at 0.002 strain.

26 c. Square and rectangular structural tubing shall be cold formed conforming to the
27 ASTM designations listed in the General Notes of the drawings.

28 d. Steel pipe shall conform to the ASTM designations listed in the General Notes of
29 the drawings.

30 B. High Strength Structural Bolts:

- 31 1. High strength structural bolts shall conform to the ASTM designations listed in the General
32 Notes of the drawings.

- 33 2. High strength bolts shall be detailed and installed in accordance with AISC - "Specification
34 for Structural Joints Using High-Strength Bolts."

- 35 3. Manufacturer's symbol and grade markings shall appear on all bolts and nuts.

36 C. Anchoring Devices:

- 37 1. Anchor Rods: Anchor rods used with structural steel members shall be plain threaded rods
38 conforming to the ASTM designations listed in the General Notes of the drawings.

- 1 2. Expansion Anchors: Expansion anchors shall consist of one-piece wedge type carbon steel
2 anchors with heavy-duty nuts and washers. All components shall be zinc plated in
3 accordance with ASTM B633. Refer to the drawing details and General Notes for the
4 expansion anchors used as the basis of design and the acceptable alternates.
- 5 3. Adhesive Anchoring System: Adhesive anchoring system shall consist of a threaded anchor
6 rod complete with nut and washer and the adhesive cartridge. Refer to the drawing details
7 and General Notes for the adhesive anchoring systems used as the basis of design and the
8 acceptable alternates.
- 9 a. Nuts shall meet ASTM A563, Grade DH, and washers shall meet ASTM F436.
- 10 b. All components shall be zinc plated in accordance with ASTM B633 SC1.
- 11 c. Adhesive shall consist of a two-part acrylic based adhesive applied in a dual
12 cartridge dispensing system that properly mixes the components at the point of
13 application.
- 14 D. Welding Materials:
- 15 1. Type required for material being welded in conformance with AWS D1.1.
- 16 E. Stud Connectors:
- 17 1. For threaded studs that are being used to connect steel beams to embed plates, use ASTM
18 A108, Type A, Grades 1010 through 1020 forged steel, headed uncoated with a minimum
19 tensile strength of 61,000 psi. Fabricated within the tolerances set forth in AWS D1.1.
- 20 2. Studs applied by means of the electric arc welding process and shall use an arc shield
21 ferrules of heat resistant ceramic.
- 22 F. Galvanizing: Where indicated on the drawings, steel shall be galvanized by the hot-dip process after
23 fabrication conforming to ASTM A123. All exterior steel that will remain exposed shall be galvanized,
24 unless otherwise indicated.
- 25 G. Paints and Primers:
- 26 1. Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer.
- 27 2. Galvanizing repair paint: SSPC Paint 20.
- 28 3. Refer to Specification Section 09 90 00 for additional paint requirements.
- 29 H. Non-Shrink Grout for Base and Bearing Plates: Non-shrink grout, conforming to ASTM C1107, shall
30 be pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sand,
31 Portland cement, shrinkage compensating agents, plasticizing and water reducing agents. All
32 constituents shall meet the requirements of these specifications. Minimum compressive strength at
33 28-days shall be 7,000 psi as determined by ASTM C109. Follow manufacturer's instructions for
34 handling, mixing, placing and curing. Acceptable products are:
- 35 1. Euclid Chemical Company - Euco N.S. Grout
- 36 2. L&M Construction Chemical - Crystex.
- 37 3. Master Builders - Masterflow 713.
- 38 4. Sonneborn - SonnogROUT.
- 39 5. Five Star Products Inc. – Five Star Grout.
- 40 6. Dayton Superior - Sure-Grip High Performance Grout.
- 41 7. Dayton Superior – 1107 Advantage Grout.

1 **2.2 FABRICATION AND MANUFACTURE**

2 A. Fabrication Procedures (non-AESS):

- 3 1. Fabricate all structural steel items in accordance with AISC Specifications and as indicated
4 on the approved shop drawings.
- 5 2. Properly mark materials for field assembly and location for which intended. Fabricate for
6 delivery sequence that will expedite erection and minimize handling of materials.
- 7 3. Complete structural steel assemblies before shop priming or galvanizing.

8 B. Shop Connections:

- 9 1. All shop connections shall be welded, unless noted otherwise on drawings. Connections
10 shall develop the full strength of the adjoining members unless detailed otherwise.
- 11 2. All holes shall be either drilled or punched, as no burning of holes will be permitted, including
12 the enlargement of holes. Provide all holes required for connections and for attaching the
13 work of other trades where such holes are shown if furnished prior to fabrication.
- 14 3. Connections shall be detailed as standard framed beam connections (bearing type) in
15 accordance with the AISC Manual of Steel Construction - Allowable Stress Design.
16 Connections which require oversized holes or slotted holes in which the force is other than
17 normal to the axis of the slot shall be detailed as "Slip-Critical Connections" and noted as
18 such on the erection drawings. Provide bearing plates and end anchorage for beams resting
19 on masonry.
- 20 4. All full and partial penetration welds shall be fully detailed on the shop drawings. Use
21 backing for all full penetration welds.
- 22 5. Weld access holes shall be fabricated in accordance with the recommendations of AWS
23 D1.1 and AISC Specification.

24 C. Shear Connectors:

- 25 1. Shear stud connector for embedded plates and angles shall be welded in the fabrication
26 shop in accordance with AWS D1.1.

27 D. Deck support framing and seats: Furnish all miscellaneous framing necessary to fully support the
28 roof and floor steel decking.

29 E. Shop Priming:

- 30 1. Unless noted otherwise below, structural steel shall not be shop primed.
- 31 2. The following are steel surfaces to receive shop priming:
- 32 a. Surfaces outside the building envelope that are not galvanized.
- 33 b. Surfaces to be painted per Architect's drawings.
- 34 3. If the steel pieces are to be shop primed, the following surfaces are exceptions to shop
35 priming:
- 36 a. Surfaces embedded in concrete or mortar. Extend priming of partially embedded
37 members to a depth of 2 inches.
- 38 b. Surfaces to be field welded.
- 39 c. Surfaces to be high-strength bolted with slip-critical connections.
- 40 d. Top flanges of beams supporting composite steel decking.

- 1 e. Surfaces to receive sprayed fire-resistive materials.
2 f. Galvanized surfaces.
- 3 4. Surface Preparation: Clean Surfaces to be painted. Remove loose rust and mill scale and
4 spatter, slag, or flux deposits. Prepare surfaces according to the following specifications
5 and standards:
- 6 a. SSPC-SP3, "Power Tool Cleaning."
- 7 5. Priming: Apply primer in accordance with paint manufacturer's recommendations, and at a
8 rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use
9 priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
- 10 F. Finished Paint System:
- 11 1. Finished paint coats shall be in accordance with paint manufacturer's recommendations,
12 and specification Division 9.
- 13 2. Paint shall be free of sags, runs, drips or other defects. Allow ample drying time before
14 handling to prevent damage to coatings.
- 15 3. Strip paint corners, crevices, bolts, welds, and sharp edges.
- 16 4. Apply two coats of shop paint to surfaces that will be inaccessible after assembly or erection.
17 Change color of the second coat to distinguish it from the first.
- 18 G. Finished Paint System for Exposed Structural Steel: Structural steel exposed to the elements of
19 weather shall be painted as follows:
- 20 1. Apply one coat of steel primer in shop as specified above.
- 21 2. Apply two coats of alkyd enamel paint to a minimum dry film thickness of 1.5 mils for each
22 coat. Paint shall be applied according to the manufacturer's recommendations.
- 23 3. Paint shall be free of sags, runs, drips or other defects. Allow ample drying time before
24 handling to prevent damage to coatings.
- 25 H. Galvanizing:
- 26 1. Hot-Dip Galvanized Finish: Apply Zinc coating by the hot-dip process to structural steel
27 according to ASTM A 123.
- 28 a. Fill vent holes and grind smooth after galvanizing.
- 29 b. Unless otherwise noted on drawings or in Division 9, all exterior steel components
30 exposed to the elements shall be galvanized, including, but not limited to, lintels.

31 **PART 3 - EXECUTION**

32 **3.1 SURFACE CONDITIONS**

- 33 A. Examine the areas and conditions under which work of this Section will be performed. Correct
34 conditions detrimental to timely and proper completion of the Work. Do not proceed until
35 unsatisfactory conditions have been corrected.

1 **3.2 ERECTION**

2 A. Erection Procedures:

- 3 1. The erector and not the SEOR shall be responsible for the means, methods and safety of
4 erection of the structural steel framing.
- 5 2. Erection of all structural steel items shall meet the requirements of AISC "Specification and
6 Code of Standard Practice."
- 7 3. All work shall be erected square, plumb, straight and true, accurately fitted and with tight
8 joints and intersections, by mechanics experienced in the erection of structural steel. Make
9 allowances for difference between temperature at time of erection and mean temperature
10 when structure is completed and in service.
- 11 4. Clean the bearing surface and other surfaces that will be in permanent contact before
12 assembly.
- 13 5. All base plates shall be supported on steel wedges, steel shims or heavy duty leveling nuts
14 until the supported members have been leveled and plumbed.
- 15 a. Snug tighten anchor rods after supported members have been positioned and
16 plumb. Do not remove wedges or shims but, if protruding, cut off flush with edge
17 of base plate before packing with grout.
- 18 b. Promptly place non-shrink grout between bearing surfaces and base plates so no
19 voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.
20 Comply with manufacturers written installation instructions for shrinkage-resistant
21 grouts.
- 22 6. Field connections of structural work shall be made with either high strength bolts (bearing
23 type) or by welding. Proper precaution shall be taken to ensure that anchored items will not
24 be distorted or overstressed due to improperly fabricated items.
- 25 7. Splice members only where indicated unless, with the SEOR's approval, splices not
26 indicated would result in lower costs due to reduced shipping expense. For splices not
27 indicated, submit structural calculations prepared under direct supervision of and signed by
28 a Professional Engineer licensed in the state where the project is located.
- 29 8. Do not use thermal cutting during erection unless approved by the Engineer/Architect in
30 writing.
- 31 9. Steel erection shall not proceed without concrete in footings, piers, and walls attaining 75%
32 of the intended minimum compressive design strength. Documentation must be provided
33 indicating compliance with this requirement.

34 B. Surveys:

- 35 1. Establish permanent benchmarks necessary for accurate erection of structural steel.
- 36 2. Check elevations of concrete surfaces, and locations of anchor bolts and similar items,
37 before erection proceeds.

38 C. Bracing and Protection:

- 39 1. Steel shall be well plumbed, leveled and braced to prevent any movement.
- 40 a. Contractor shall provide and maintain all necessary temporary guying of steel
41 frame to resist safely all wind and construction loads during erection and to assure
42 proper alignment of all parts of the steel frame.

1 2. Provide all temporary flooring, bracing, shoring and guards necessary to prevent damage
2 or injury. All partially erected steel shall be secured in an approved manner during
3 interruptions of work.

4 D. Anchor and Foundation Rods:

5 1. All anchor or foundation rods and similar steel items to be built into concrete or masonry are
6 to be set by the concrete or masonry contractors and shall be furnished promptly so that
7 they may be built in as the work progresses because cutting of structural steel members to
8 accommodate errors pertaining to embedded items will not be permitted.

9 **3.3 FIELD WELDING**

10 A. Welding Procedures:

11 1. All field welding shall be in accordance with AISC Specifications and conform to AWS D1.1
12 "Structural Welding Code - Steel".

13 a. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges"
14 for bearing, adequacy of temporary connections, alignment, and removal of paint
15 on surfaces adjacent to field welds.

16 b. Assemble and weld built-up sections by methods that will maintain true alignment
17 of axes without exceeding tolerances of AISC's "Code of Standard Practice" for
18 Steel Buildings and Bridges" for mill material.

19 2. Contractor shall remove ceramic ferrules from shear connectors in sufficient time to allow
20 for inspection of welds prior to placement of the concrete.

21 **3.4 REPAIRS, PROTECTION, AND TOUCH UP**

22 A. Repair damaged galvanized coatings and on galvanized items with galvanized repair paint according
23 to ASTM A780 and manufacturer's written instructions.

24 B. Touch up Painting: After installation, promptly clean, prepare, and prime or reprime field welds, final
25 connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates and abutting
26 structural steel.

27 1. Clean and prepare surfaces by SSPC-SP2 hand-tool cleaning or SSPC-SP3 power-tool
28 cleaning.

29 2. Apply a compatible primer of the same type as shop primer used on adjacent surfaces.

30 3. Secure approval by the Architect prior to field painting.

31 **3.5 GROUTING**

32 A. Grouting under structural framing members shall be completed after all members have been plumbed
33 and braced and before imposed loads are placed thereon.

34 B. Remove all defective concrete, dirt, oil, grease and other foreign matter from surfaces to which grout
35 will be placed.

36 **3.6 MISCELLANEOUS STEEL AND STEEL LINTELS**

37 A. Furnish and install all miscellaneous steel as detailed in architectural and structural drawings.

38 B. The steel fabricator shall furnish all steel lintels required for masonry wall construction indicated in
39 the architectural and structural drawings and schedules.

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- 1 C. Provide additional steel framing for continuous support of steel deck edges at openings and column
- 2 interruptions.
- 3 D. All exterior exposed steel shall be hot-dip galvanized in accordance with ASTM A123.
- 4 **END OF SECTION**

SECTION 05 31 00
STEEL DECK

1
2
3 PART 1 – GENERAL
4 1.1 SECTION INCLUDES
5 1.2 RELATED WORK
6 1.3 REFERENCES
7 1.4 QUALITY ASSURANCE
8 1.5 SUBMITTALS
9 1.6 DELIVERY STORAGE AND HANDLING
10 PART 2 – PRODUCTS
11 2.1 STEEL ROOF DECK
12 2.2 COMPOSITE FLOOR DECK
13 2.3 FASTENERS
14 2.4 ACCESSORIES
15 PART 3 – EXECUTION
16 3.1 ERECTION
17 3.2 ROOF DECK
18 3.3 FLOOR DECK
19 3.4 FIELD TOUCH UP

20 **PART 1 - GENERAL**

21 **1.1 SECTION INCLUDES**

22 A. Fabrication and erection of steel deck. The Work shall include, but not be limited to the following:

- 23 1. Roof deck, roof deck accessories, and roof deck fasteners.
24 2. Composite floor deck.

25 B. Structural notes indicated on the drawings regarding steel decking shall be considered a part of this
26 specification.

27 **1.2 RELATED WORK**

- 28 A. Pertinent Sections of Division 01.
29 B. Section 03 30 00 - Cast-in-Place Concrete.
30 C. Section 05 12 23 - Structural Steel.

31 **1.3 REFERENCES**

32 A. Codes and Standards: Comply with the provisions of the following codes, specifications and
33 standards, except where more stringent requirements are shown or specified. Where any provisions
34 of other pertinent codes and standards conflict with this specification, the more stringent provision
35 shall govern.

- 36 1. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural
37 Members.
38 2. ASCE 9 - Standard for the Structural Design of Composite Slabs and Standard Practice for
39 Construction and Inspection of Composite Slabs.
40 3. ASTM A36 - Standard Specification for Carbon Structural Steel.
41 4. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
42 5. ASTM A653 - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron
43 Alloy-Coated (Galvannealed) by the Hot-Dip Process.
44 6. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-
45 Coated by the Hot-Dip Process.
46 7. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural,
47 High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution
48 Hardened, and Bake Hardenable.
49 8. AWS D1.1 - Structural Welding Code - Steel.

- 1 9. AWS D1.3 - Structural Welding Code - Sheet Steel.
- 2 10. SDI Roof Deck Design Manual.
- 3 11. SDI Floor Deck Design Manual.
- 4 12. SDI Diaphragm Design Manual.

5 **1.4 QUALITY ASSURANCE**

- 6 A. Fabricator: Company specializing in performing the work of this section with minimum five (5) years
7 documented experience at manufacturing steel deck. Fabrication Company shall be a current
8 member of the Steel Deck Institute (SDI).
- 9 B. Erector: Company specializing in performing the work of this section with minimum five (5) years
10 documented experience at erecting steel deck.
- 11 C. Welding: Qualify Welding Procedure Specifications (WPS) and welding operators in accordance with
12 AWS D1.3. Provide certifications that welders to be employed in the construction have satisfactorily
13 passed AWS qualification tests. If recertification of welders is required, retesting will be the
14 contractor's responsibility.
- 15 D. Furnish and install steel deck in accordance with the manufacturer's current ICC Research
16 Committee Report to obtain diaphragm values indicated.

17 **1.5 SUBMITTALS**

- 18 A. Prepare and submit shop drawings for Engineer's approval. Shop drawings shall indicate deck layout,
19 depth, uncoated metal thickness, framing and supports with unit dimensions and sections, shear stud
20 layout and complete end jointing. Contractor to verify measurements, lines, elevations, and details
21 of field conditions to conform with actual conditions.
- 22 B. Provide details of all accessories.
- 23 C. Shop drawings shall also indicate typical welding or mechanical anchoring pattern for steel deck and
24 accessories.
- 25 D. Prepare and submit allowable construction span tables and allowable total load tables for Engineer's
26 approval. Tables shall be accompanied with a letter of certification from the manufacturer stating the
27 tabulated design values were determined in accordance with the Steel Deck Institute's Design
28 Manuals for Roof Deck, Floor Deck and Diaphragm Design.
- 29 1. The gauges and section moduli indicated on the drawings or specified herein are minimum
30 and the gauge and section modulus of the deck furnished shall meet or exceed these
31 minimum requirements. All gauges are United States standard, measured prior to coating.
- 32 E. WPS and Procedure Qualification Records (PQR) shall be current and approved by the Structural
33 Engineer of Record (SEOR).
- 34 F. Provide manufacturer's latest recommendations and installation instructions.
- 35 G. Prepare and submit product data of proposed materials.

36 **1.6 DELIVERY, STORAGE AND HANDLING**

- 37 A. All decking materials shall be transported, stored and erected in a manner that will prevent damage
38 or deformation of sheets. Damaged material shall not be erected or repaired without Structural
39 Engineer's approval.
- 40 B. Deck panels shall be stored clear of the ground, elevated on one end, and protected from weather
41 with waterproof covering.

1 **PART 2 - PRODUCTS**

2 **2.1 STEEL ROOF DECK**

3 A. Standard Steel Roof Deck: Fabricate panels to comply with the "SDI Roof Deck Design Manual," and
4 the following:

5 1. Steel decking sheet material, minimum yield strength, depth, gage, profile, and finish are
6 indicated on the drawings, as classified by Steel Deck Institute (SDI). Panels shall be formed
7 with integral ribs and overlapping side flanges.

8 **2.2 COMPOSITE FLOOR DECK**

9 A. Composite Floor Deck: Fabricate panels with integrally embossed or raised pattern ribs to comply
10 with the "SDI Floor Deck Design Manual," and the following:

11 1. Steel decking sheet material, minimum yield strength, depth, gage, profile, and finish are
12 indicated on the drawings, as classified by Steel Deck Institute (SDI). Panels shall be formed
13 with integral ribs and overlapping side flanges.

14 **2.3 FASTENERS**

15 A. Support Fasteners:

16 1. Welded: Refer to drawings for weld size and spacing requirements.

17 a. Shear studs may replace support fasteners. Refer to drawings for requirements.

18 1) Provide headed stud type of cold finished carbon steel per Section
19 05 12 23.

20 2) Use ferrules suitable for use with galvanized steel deck.

21 b. Weld washers required for material less than 0.028" thick. Welding washers shall
22 a minimum thickness of 0.0598 inches and be applicable to AWS D1.3 type
23 welding and of type as recommended by the deck manufacturer.

24 c. Weld metal shall penetrate all layers of deck material and shall have good fusion
25 to the supporting steel. Fasten ribbed deck to steel support members at ends and
26 intermediate supports.

27 1) All welding shall be in conformance with previously cited AWS
28 recommendations in appearance and quality of welds, and the methods
29 used in correcting welding work.

30 B. Side Lap Fasteners:

31 1. Mechanical: Zinc coated self-drilling, self-tapping type (minimum No. 10) steel screws. Refer
32 to drawings for fastener spacing requirements.

33 **2.4 ACCESSORIES**

34 A. Steel materials to conform to ASTM A108 meeting the requirements of ASTM A653, G60 coating.

35 B. Provide all closers, fillers, starters, sump pans, metal cant strips, ridge and valley plates, pour stops,
36 column closures, girder fillers, and similar accessories required for a complete installation. Provide
37 cover plates at all locations where direction of deck span changes. Unless otherwise noted,
38 accessories shall be of the same steel sheet material, finish, and thickness as the deck sections.

39 C. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

- 1 D. Recessed Sump Pans: Single piece steel sheet of same material, finish and thickness as the deck,
2 with 3-inch-wide flanges and recessed pan of 1-1/2-inch minimum depth. Cut drain holes in the field.

3 **PART 3 - EXECUTION**

4 **3.1 ERECTION**

- 5 A. Verify that field conditions are acceptable and are ready to receive work. Correct inaccuracies in
6 alignment or level before deck units are finally placed.
- 7 B. Deck units and deck accessories herein specified shall be thoroughly and securely erected by
8 experienced workmen fastening to supporting steel members as herein specified. All work shall be
9 in conformance with manufacturer's latest printed recommendations and approved shop drawings.
- 10 C. Beginning of installation means installer accepts existing conditions.
- 11 D. The finished work shall be true, flat planes and to slopes indicated with end joints flush and without
12 sharp protruding edges. Exposed underside of deck shall be true without defect.
- 13 E. Where large predetermined openings for elevators, stairs, ducts, and similar elements passing
14 through the deck units occur, furnish prefabricated units to fit job conditions. Where other holes or
15 openings are required in decking after erection, reinforce such holes as indicated on the drawings.
16 Cantilever deck to the edge of slabs only as indicated on the drawings.
- 17 F. Burning of holes in decking will not be permitted.
- 18 G. Steel decking shall be installed to span supporting steel members at right angles. Panels shall be
19 securely anchored to each structural support it rests on or passes.
- 20 H. Except where single spans are indicated, furnish decking in minimum lengths to span 3 spans with
21 telescoping or nested 2-inch end laps and interlocking or nested side laps.

22 **3.2 ROOF DECK**

- 23 A. Fasten roof deck panels to steel supporting members using welds as specified herein and on the
24 drawings.
- 25 B. Deck shall be fastened through the bottom of the deck rib to all structural supports for the specific
26 deck sections.
- 27 C. End bearing of roof decking shall have a minimum of 1-1/2 inches of bearing occurring over structural
28 supports.
- 29 D. Place deck panels on structural supports and adjust to final position with ends aligned. Attach to
30 supports immediately after placement.
- 31 E. Roof sump pans shall be installed over openings provided in roof deck with flanges welded to the top
32 of the deck. Space welds at 12 inches apart with at least 1 weld in each corner.
- 33 F. Install all roof deck accessories in accordance with the roof deck manufacturer's written instructions.

34 **3.3 FLOOR DECK**

- 35 A. Fasten steel floor deck to supporting steel with welds, mechanical fasteners, drive pins, shear studs
36 as specified herein and on the drawings.
- 37 B. Unless noted otherwise, secure side laps and perimeter edges of units with fasteners at mid-span
38 between supports or 36 inches on center, whichever distance is smaller.

- 1 C. Place deck panels on structural supports and adjust to final position with ends aligned. Attach to
2 supports immediately after placement.
- 3 D. Install deck ends over supports with a minimum end bearing of 1-1/2 inches.
- 4 E. Install pour stops and girder fillers to supporting structure according to manufacturer's
5 recommendations.
- 6 F. Fasten column closures and cell closures to deck to provide a tight fit. Provide cell closures at
7 changes of direction of deck units, unless otherwise noted.
- 8 G. Install all floor deck accessories in accordance with the floor deck manufacturer's written instructions.
- 9 **3.4 FIELD TOUCH UP**
- 10 A. After erection, all weld burn marks and abraded spots shall be cleaned and field painted with a rust-
11 inhibiting metal primer matching formulations and color of shop coat or a zinc-rich rust inhibiting paint
12 for galvanized deck surfaces.
- 13 **END OF SECTION**

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SECTION 05 40 00
COLD-FORMED STEEL FRAMING (CFSF) SYSTEM

1
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3 PART 1 – GENERAL
4 1.1 SECTION INCLUDES
5 1.2 RELATED WORK
6 1.3 REFERENCES
7 1.4 QUALITY ASSURANCE
8 1.5 SYSTEM PERFORMANCE REQUIREMENTS
9 1.6 SUBMITTALS
10 1.7 DELIVERY STORAGE AND HANDLING
11 PART 2 – PRODUCTS
12 2.1 MATERIALS
13 2.2 FABRICATION
14 PART 3 – EXECUTION
15 3.1 INSPECTION
16 3.2 INSTALLATION

17 **PART 1 - GENERAL**

18 **1.1 SECTION INCLUDES**

- 19 A. Load bearing structural steel studs framing system of 18 to 12 gauge (43 mil to 97 mil) members
20 along with fasteners and related accessories. Furnish and install cold-form steel framing, as shown
21 on the drawings and specified herein. Work shall include, but not be limited to the following items:
- 22 1. Non-load bearing formed steel stud exterior wall.
- 23 2. Provide tracks, blocking, lintels, clips angles, bridging, shoes, reinforcements, fasteners and
24 accessories to construct a complete steel framing system.
- 25 B. Structural notes indicated on the drawings regarding cold-formed steel framing system shall be
26 considered a part of this Specification.

27 **1.2 RELATED WORK**

- 28 A. Pertinent Sections of Division 01.
29 B. Section 05 12 23 - Structural Steel.
30 C. Section 05 31 00 - Steel Deck.
31 D. Division 9 for non-load bearing studs of 20 gauge (33 mil) or lighter.

32 **1.3 REFERENCES**

- 33 A. Codes and Standards: Comply with the provisions of the following codes, specifications, and
34 standards, except where more stringent requirements are shown or specified. Where any provisions
35 of other pertinent codes and standards conflict with this specification, the more stringent provision
36 shall govern.
- 37 1. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural
38 Members.
39 2. AISI S200 - North American Standard for Cold-Formed Steel Framing - General Provisions.
40 3. AISI S202 - North American Standard for Cold-Formed Steel Structural Framing.
41 4. AISI S211 - North American Standard for Cold-Formed Steel Framing - Wall Stud Design.
42 5. AISI S212 - North American Standard for Cold-Formed Steel Framing - Header Design.
43 6. AISI S213 - North American Standard for Cold-Formed Steel Framing - Lateral Design.
44 7. ASTM A653 - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron
45 Alloy-Coated (Galvannealed) by the Hot-Dip Process.
46 8. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural,
47 High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution
48 Hardened, and Bake Hardenable.

- 1 9. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members.
- 2 10. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and
- 3 Axial) Steel Studs and Related Accessories.
- 4 11. AWCI - Association of Wall and Ceiling Industries.
- 5 12. AWS D1.3 - Structural Welding Code - Sheet Steel.
- 6 13. SSMA - Steel Stud Manufacturers Association.

7 **1.4 QUALITY ASSURANCE**

8 A. Workmen Qualifications:

- 9 1. For the actual erection of cold-formed steel framing system, use only skilled journeymen
- 10 steel framing erectors who are thoroughly experienced with the materials and methods
- 11 specified.
- 12 2. Use qualified welders and comply with AWS standards.

13 B. Design Qualifications:

- 14 1. Engage a fabricator who uses a qualified Structural Engineer, licensed in the state where
- 15 the trusses are to be installed, to prepare calculations, shop drawings and other structural
- 16 data for cold-formed steel framing system.

- 17 C. Manufacturer: Company specializing in performing the work of this section with a minimum of five (5)
- 18 years documented experience at manufacturing cold-formed steel and framing systems and related
- 19 accessories. Manufacturer shall be a current and "full" member of the Steel Stud Manufacturers
- 20 Association (SSMA) or Steel Framing Industry Association (SFIA).

- 21 D. All cold-formed steel furnished under this section shall be supplied by a manufacturer who is a current
- 22 member of the Steel Stud Manufacturers Association (SSMA) or Steel Framing Industry Association
- 23 (SFIA).

- 24 E. Steel studs, headers, and other elements used for this project are sized based on SSMA. Elements
- 25 of equal or greater capacity may be exchanged.

26 **1.5 SYSTEM PERFORMANCE REQUIREMENTS**

27 A. Structural Performance:

- 28 1. Provide CFSF capable of withstanding design loads indicated on the plans.
- 29 2. Design CFSF to withstand design loads meeting the following deflection limits:
 - 30 a. Exterior walls backing up brick or stone veneer: Horizontal deflection of 1/600 of
 - 31 wall height.
 - 32 b. Exterior walls clad with metal siding, exterior insulated finish systems or other
 - 33 flexible non-brittle finishes: Horizontal deflection of 1/240 of wall height.
- 34 3. Design CFSF to provide for movement of framing members without damage or
- 35 overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors,
- 36 or other detrimental effects when subject to a maximum ambient temperature change of
- 37 120°F.
- 38 4. Design system to accommodate construction tolerances, deflection of building structural
- 39 members (1-inch maximum), and clearances of intended openings.
- 40 5. CFSF shall be designed in accordance with all AISI Standards.

1 **1.6 SUBMITTALS**

2 A. Shop Drawings:

3 1. Prepare and submit complete erection and detailed shop drawings for Engineer's approval,
4 including framing plans indicating size, gauge, weight and location of all framing members.
5 Shop drawings shall indicate the following:

6 a. Component details, framed openings, bearing, anchorage, loading, welds, type
7 and location of fasteners, bracing, bridging, strapping, connections, and
8 accessories or items required of other related work. Provide stud layout.

9 b. Describe method for securing studs to tracks and for bolted/welded framing
10 connections.

11 c. Provide calculations for loadings and stresses of steel framing system, including
12 specially fabricated components, prepared by a registered Professional Engineer,
13 with registration from the state in which the building is located.

14 d. Detail size and location of all bridging, strapping, bracing, splices, and accessories
15 required for installation.

16 B. Product Data:

17 1. Provide product data on standard framing members. Describe materials and finish, product
18 criteria and limitations. Submit manufacturer's installation instructions.

19 **1.7 DELIVERY, STORAGE AND HANDLING**

20 A. Steel members shall be transported, stored and erected in a manner that will avoid any damage or
21 deformation. Bent or deformed members will be rejected and shall be replaced or repaired at the
22 expense of the responsible party. Store clear of ground and in such a manner so as to eliminate
23 excessive handling.

24 **PART 2 - PRODUCTS**

25 **2.1 MATERIALS**

26 A. Framing Materials:

27 1. Studs shall conform to the ASTM designations listed in the General Notes of the drawings,
28 unless noted otherwise, and be formed to channel shape, punched web, with nominal size
29 as indicated on drawings.

30 2. Track shall be minimum 18 gauge (43 mil) thick sheet steel, channel shaped, solid web,
31 same width as above studs. Track shall provide a tight fit for studs.

32 B. Accessories:

33 1. Bracing, furring and bridging shall consist of formed sheet steel with thickness determined
34 for conditions encountered. Provide manufacturer's standard shapes, complete with finish
35 same as framing members.

36 2. Plates, gussets and clips shall consist of formed sheet steel with thickness determined for
37 conditions encountered. Provide manufacturer's standard shapes, complete with finish
38 same as framing members.

- 1 C. Fasteners:
- 2 1. Self-drilling, self-tapping screws, bolts nuts and washers shall conform to ASTM A90,
3 complete with hot-dip galvanized.
- 4 2. Expansion anchors shall be "Kwik" bolts, as manufactured by Hilti, Inc.
- 5 3. All other fasteners shall be as indicated on drawings or as recommended by the above cold-
6 form manufacturer.
- 7 4. Welding connections are to be performed in accordance with American Welding Society
8 (AWS) D1.3 "Structural Welding Code - Sheet Steel." Consult AWS D19.0 latest edition
9 "Welding Zinc Coated Sheet" and ANSI Standard Z49.1 for information regarding welding
10 procedures.

- 11 D. Finishes:
- 12 1. Furnish all studs system components with a factory galvanized (G60) coat finish.

13 **2.2 FABRICATION**

- 14 A. Fabricate assemblies of framed sections, of sizes and profiles required with framing members fitted,
15 reinforced and braced to suit design requirements.
- 16 B. Fit and assemble in largest practical sections for delivery to Worksite, ready for installation.
- 17 C. Bearing studs must be fabricated with full stud end seated against track web. Do not use studs that
18 have been cut at punchouts.

19 **PART 3 - EXECUTION**

20 **3.1 INSPECTION**

- 21 A. Verify that substrate surfaces and building framing components are ready to receive work.
- 22 B. Beginning of installation means acceptance of existing conditions and substrate.

23 **3.2 INSTALLATION**

- 24 A. General:
- 25 1. Cold-formed steel framing system shall consist of structural steel studs with locations as
26 shown on drawings. All work shall be in accordance with approved shop drawings and
27 manufacturer's latest printed specifications. Framing members shall be securely attached
28 by mechanical fasteners as indicated on drawings and as recommended by the
29 manufacturer.
- 30 a. All field welding shall be in accordance with AWS previously cited.
- 31 b. Wire tying of stud or components in system will not be allowed.
- 32 c. Complete framing system ready to receive subsequent facing material.
- 33 2. Provision shall be made in studs for rigid fastening of all blocking and special braces or
34 framing and for attachment and support of electrical outlets or other equipment indicated to
35 be supported by stud construction.
- 36 a. All anchorage, bracing and blocking shall be in accordance with approved shop
37 drawings and as recommended by the manufacturer.
- 38 3. Surfaces abraded by handling, weld locations and other miscellaneous defects shall be
39 touched-up with zinc-rich galvanizing compound (ZRC) coating.

- 1 B. Erection of Studding:
- 2 1. Top and bottom runner members shall be the same size and gauge as the stud and be
3 continuous for the total length of framing system or as long as practical and shall be securely
4 attached a maximum of 24 inches on centers with approved fastening devices. Studs shall
5 extend in one piece full height vertically between runners, spaced no greater than 24 inches
6 on centers, with all web cut-outs in perfect alignment. Studs shall provide solid backing at
7 corners and jambs. Install studs with all components property aligned and braced with all
8 work plumb and true ready and acceptable to receive surface materials.
- 9 a. Coordinate installation of sealant with floor and ceiling tracks.
10 b. Field cutting of studs shall be done by sawing.
11 c. Splices in axial load studs will not be permitted.
12 d. Erect load bearing studs, brace and reinforce to develop full strength to meet
13 design requirements.
14 e. Extend stud framing through ceiling to underside of floor or roof structure above.
15 f. Install intermediate studs above and below openings with studs equally spaced to
16 correspond to adjacent stud spacing.
17 g. Provide deflection allowance in stud track, directly below horizontal building
18 framing for non-load bearing framing.
19 h. Framing fabricator shall ensure punchout alignment when assembling framing and
20 field cutting to length.
21 i. All framing components shall be cut squarely for attachment to perpendicular
22 members.
23 j. In the event a track butt joint occurs within a panel, abutting pieces of track shall
24 be butt welded or spliced together. No such splices shall occur at any head or sill
25 condition.
- 26 2. Steel studs shall be located not more than 2 inches from all door, abutting partitions, partition
27 corners and other construction. Unless detailed otherwise, runner track or stud member
28 shall be used as a runner over door frames. Structural studs and joists shall be securely
29 and rigidly anchored in place to give a total and complete support to subsequent materials
30 attached thereto. All studs shall be securely attached to jamb and head anchor clips of each
31 door frame by manufacturer's recommended method.
- 32 a. Construct corners using minimum three studs. Jamb studs at doors, windows, and
33 other wall openings shall be designed to resist the tributary load of the opening
34 and meet specified performance requirements.
- 35 b. Cold-rolled steel channel stiffeners or bridging shall be provided and installed
36 horizontally every 60 inches in all framing systems through stud web cut-outs with
37 welding clips welded in place at each stud.

38 **END OF SECTION**

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SECTION 05 45 00
EQUIPMENT SUPPORT SYSTEMS

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22 **PART 1 - GENERAL**

23 **1.1 RELATED DOCUMENTS**

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

26 **1.2 SUMMARY**

- 27 A. Section includes:
28 1. Continuous slot, bolted metal framing channels and all associated fittings and hardware.
29 2. Design and engineering to provide code compliant support framing fabricated to performance
30 standards specified.
31 3. Installation of design/build fabricated bolted framing as support for vendor stall canopy/framing.
32 B. Related Sections:
33 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
34 2. Section 05 12 13 "Architecturally Exposed Structural Steel Framing" for framing supporting work of
35 this section.
36 3. Section 05 75 00 "Decorative Formed Metal" for coordination with ceiling panel support system
37 (STRUT-2) for (MTPNL-1).
38 4. Section 09 51 13 "Acoustical Panel Ceilings" for coordination with ceiling panel support system
39 (STRUT-2) for (ACRYLIC-1).
40 5. Section 09 91 23 "Interior Painting" for finish painting requirements.

41 **1.3 REFERENCES**

- 42 A. ASTM A123 - Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled,
43 Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
44 B. ASTM A653 - General Requirements for Steel Sheet, Zinc-Coated Galvanized by the Hot-Dip Process
45 C. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-
46 Alloy and High-Strength Low-Alloy with Improved Formability (Formerly ASTM A570)
47 D. ASTM F1136 – Standard Specification for Chromium/Zinc Corrosion Protective Coatings for Fasteners
48 E. ASTM A907 - Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot-Rolled,
49 Structural Quality
50 F. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel
51 G. MFMA - Metal Framing Manufacturers Association
52 H. ANSI/NFPA 70– National Fire Protection Association (National Electrical Code)
53 I. AISI - American Iron and Steel Institute

- 1 **1.4 ACTION SUBMITTALS**
- 2 A. Submit manufacturer's product data on strut channels including, but not limited to, types, materials, finishes,
- 3 gauge thickness, and hole patterns. For each different strut cross-section, submit cross sectional properties
- 4 including Section Modulus (Sx) and Moment of Inertia (Ix).
- 5 1. Submit drawings of strut and accessories including clamps, brackets, hanger rods, and fittings.
- 6 B. Submit Shop Drawings which show methods of suspending and anchoring equipment, station details,
- 7 equipment locations and detailed dimensions of all major components. Medical equipment supports shall
- 8 be shown on an accurate 3-D model.
- 9 1. Final support system shop drawings and submittal information shall incorporate coordination
- 10 drawings information of plenum space utilization.
- 11 2. Provide structural calculations and engineering seals to further ensure that support system design
- 12 meets the requirements.
- 13 C. Delegated-Design Submittal: For equipment support systems indicated to comply with performance
- 14 requirements and design criteria, including analysis data signed and sealed by the qualified professional
- 15 engineer licensed in the State of Wisconsin responsible for their preparation.
- 16 **1.5 INFORMATIONAL SUBMITTALS**
- 17 A. Field quality-control reports.
- 18 B. Warranties: Sample of special warranties.
- 19 **1.6 QUALITY ASSURANCE**
- 20 A. Material and installation shall be provided by a qualified contractor, with at least ten years experience in the
- 21 manufacture and installation of metal framing medical equipment supports. Vendor shall demonstrate
- 22 experience of projects of similar scope and size, and shall maintain a continuing quality assurance program
- 23 for both its material and installation crews.
- 24 B. Manufacturers: Firms regularly engaged in the manufacture of bolted metal framing of the types required,
- 25 whose products have been in satisfactory use in similar service for not less than 5 years.
- 26 C. Contractor shall provide the single source responsibility for design, materials and workmanship, and shall
- 27 provide a warranty period of one year from date of acceptance by Owner.
- 28 D. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for
- 29 installation of bolted metal support framing required for this Project.
- 30 E. MFMA Compliance: Comply with the latest revision of MFMA Standards Publication Number MFMA-3,
- 31 "Metal Framing Standards Publication".
- 32 F. NEC Compliance: Comply with the latest revision NFPA 70 - Article 352 "Surface Metal Raceways and
- 33 Surface Nonmetallic Raceways".
- 34 G. UL Compliance: Comply with UL "Standard for Surface Metal Raceway and Fittings", UL 5.
- 35 H. Bolted framing channels and fittings shall have material certification sheets and test reports shall be made
- 36 available by the manufacturer upon request.
- 37 I. Preinstallation Conference: Conduct conference at Project site.
- 38 J. Mockups: Build assembly mockups of AESS and elements supported to set quality standards for fabrication
- 39 and installation of entire assembly.
- 40 1. Build mockup of typical portion of complete composite vendor stall canopy as shown on Drawings.
- 41 Provide supporting channel grid for ceiling panels.
- 42 2. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete a
- 43 mockup submittal for review.
- 44 3. Subject to compliance with requirements, approved mockups may become part of the completed
- 45 Work if undisturbed at time of Substantial Completion.
- 46 **1.7 COORDINATION**
- 47 A. Ceiling Plenum Coordination:
- 48 1. Submit an accurate 3-D model of the support system to the Contractor, who will use the 3-D model
- 49 for clash detection. The Contractor will develop and analyze the 3-D model, based on electronic 3-D
- 50 information furnished by other contractors who will share the ceiling plenum space.
- 51 **1.8 DELIVERY, STORAGE, AND HANDLING**
- 52 A. Deliver strut systems and components carefully to avoid breakage, denting, and scoring finishes. Do not
- 53 install damaged equipment.
- 54 B. Store strut systems and components in original cartons and in clean dry space; protect from weather and
- 55 construction traffic.

1 **1.9 WARRANTY**

- 2 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace
3 components of that fail in materials or workmanship within specified warranty period.
4 1. Failures include, but are not limited to, the following:
5 a. Structural failures including, but not limited to, excessive deflection.
6 b. Noise or vibration caused by support framing movement from equipment operation.
7 2. Warranty Period: Twenty years from date of Substantial Completion.

8 **PART 2 - PRODUCTS**

9 **2.1 ACCEPTABLE MANUFACTURERS**

- 10 A. Product Manufacturer: Subject to compliance with these specifications, strut systems to be installed shall
11 be as manufactured by Unistrut, Inc. or Design/Builder approved equal. Framing system shall be equal to:
12 1. Unistrut Metal Framing.
13 2. Telestrut Telescoping Strut.
14 3. Telespar Telescoping Tubing.
15 B. Approved Design/Builder:
16 1. Unistrut Wisconsin
17 15350 W National Avenue
18 New Berlin, WI 53151-5158
19 Contact: Carl Pfeifer
20 Phone: (262)796-8707
21 Phone: 262-796-8710
22 Fax: 262-796-8712
23 Email: cpfeifer@unistrut.com
24 2. Equipment Support Systems™
25 2390 Capitol Landing Drive
26 Ballwin, MO 63017
27 Phone: (505) 401-1234
28 website: www.EquipmentSS.com
29 e-mail: ess@equipmentss.com
30 3. Vertex Steel Inc. Home Office
31 2175 Fyke Dr. Milford, MI 48381
32 Phone : (248) 684-4177
33 Fax : (248) 684-9327

34 **2.2 PERFORMANCE REQUIREMENTS**

- 35 A. Delegated Design: Design metal-framed equipment supports, including comprehensive engineering
36 analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
37 B. General:
38 1. The ceiling tile flanges shall be installed directly on the metal support framing flush with the bottom
39 of the channel opening creating a clean, unobtrusive look consistent with the room aesthetics.
40 C. Metal-framed equipment supports shall withstand the effects of the following without failure due to defective
41 manufacture, fabrication, installation, or other defects in construction:
42 1. Structural loads.
43 2. Movements of supporting structure.
44 3. Dimensional tolerances of support system and other adjacent construction.
45 4. Failure includes, but is not limited to, the following:
46 a. Deflection exceeding specified limits.
47 b. Noise or vibration created by equipment operation.
48 c. Loosening or weakening of fasteners, attachments, and other components.
49 D. Structural Loads:
50 1. Static and Dynamic Loads: As provided by-the structural engineer.
51 2. Seismic Loads: None.
52 E. Deflection of Framing Members: as follows:
53 1. System shall be true, plumb and level to the tolerances indicated, with no more than 1/720th of the
54 span maximum deflection in either plane, when maximum loading conditions are applied due to
55 equipment operation.
56 F. Lateral Bracing of Framing Members:

1 **2.3 SUPPORT SYSTEM**

- 2 A. The support system shall lend itself to a rational structural analysis with section properties of framing
3 members demonstrated by calculations. Structural calculations and drawings shall be furnished with a stamp
4 by a licensed engineer complying with all applicable codes and regulatory requirements.
5 B. Design:
6 1. Support Structure: The support members at the ceiling plane shall be located as indicated on the
7 drawings. The spacing shall allow installation of standard modular ceiling tiles, fixtures and
8 equipment. It shall be possible to attach the equipment at any point on the support system.
9 2. Ceiling Anchorage: Whenever possible, attachment to steel canopy structure above shall be done
10 by means of through bolts.
11 3. Safety Factor: The system shall be designed with a minimum safety factor of 2 based on ultimate
12 strength under static and dynamic conditions.

13 **2.4 STRUT CHANNELS AND COMPONENTS**

- 14 A. Made from easy-to-assemble systems:
15 1. Unistrut Metal Framing.
16 2. Telestrut Telescoping Strut.
17 3. Telespar Telescoping Tubing.
18 4. Similar from other manufacturers.
19 5. Anchors: Hilti KB-TZ anchors.
20 B. General: Strut shall be 1-5/8 inches wide in varying heights and shop welded combinations as required to
21 meet load capacities and designs indicated on the drawings.
22 C. Channel (**STRUT-#**):
23 1. Channel: STRUT-1A, 1B, 1C. Refer to material ID List.
24 2. Fitting: STRUT 2A, 2B, 2C, 2D. Refer to material ID List.
25 D. Finish:
26 1. Finish: Factory Plain (PL). Shop applied paint finish in Black color. Comparable paint system PT-5
27 DTM system as specified in Section 09 91 23 – Interior Painting.
28 2. Shop markings, laser etching, labeling, rust, scale, etc shall be removed prior to the application of
29 the finish.

30 **2.5 FABRICATION**

- 31 A. Where practical, fit and assemble metal-framed in manufacturer's plant. To ensure proper assembly at
32 Project site, clearly identify work that cannot be permanently factory assembled before shipment.
33 B. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

34 **PART 3 - EXECUTION**

35 **3.1 EXAMINATION**

- 36 A. Examine areas and conditions, with Installer present, for compliance with requirements for installation
37 tolerances and other conditions affecting performance of the Work.
38 B. Installation / Substrate Conditions / Acceptance:
39 1. Installation of product shall constitute acceptance of existing conditions / substrates for compatibility
40 with specified products unless the architect and Contractor are both notified in writing prior to the
41 start of installation.
42 C. Proceed with installation only after unsatisfactory conditions have been corrected.
43 D. Field Measurements:
44 1. The contractor shall make field measurements to assure that the support can be installed according
45 to plans, and without interference with structural framing, mechanical systems, plumbing or other
46 obstructions. Any interference shall be reported to the architect.
47 E. Sequencing:
48 1. The contractor shall assure that the support system is installed in a timely and practical sequence,
49 with extensive electrical, mechanical or HVAC work in the area, and prior to any ceiling framing or
50 room finishes.
51 F. Modifications:
52 1. Any changes or modifications from approved shop drawings shall require approval from the architect
53 and engineer, and shall be noted on the final drawings.
54

- 1 **3.2 INSTALLATION**
- 2 A. General:
- 3 1. Comply with manufacturer's written instructions.
- 4 2. Do not install damaged components.
- 5 3. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
- 6 B. Install components plumb and true in alignment with established lines and elevations.

7 **END OF SECTION**

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SECTION 05 50 00
METAL FABRICATIONS

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34 **PART 1 - GENERAL**

35 **1.1 SUMMARY**

- 36 A. Section Includes:
37 1. Metal fabrications (**MTL-1**)
38 a. Miscellaneous steel framing and supports.
39 b. Shelf angles.
40 c. Metal floor plate and supports.
41 d. Miscellaneous steel trim.
42 e. Metal bollards.
43 f. Guard rails.
44 g. Steel frame for Mobile Retail Display millwork.
45 h. Steel support frames for benches.
46 2. Exterior Trash Enclosure: Structural tube framing and steel panel infil.
47 3. Salvaged curtainwall re-use with sliding hardware for sliding interior panels.
48 B. Products furnished, but not installed, under this Section include the following:
49 1. Loose steel lintels.
50 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast
51 into concrete or built into unit masonry.
52 A. Related Sections:
53 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
54 2. Section 05 12 13 "Architecturally Exposed Structural Steel Framing" supporting slotted channel grid
55 for vendor stall canopy.
56 3. Section 05 45 00 "Equipment Support Systems" for slotted channel grid suspended from
57 architecturally exposed steel framing.

- 1 4. Section 05 75 00 "Decorative Formed Metal" for vendor stall canopy panels.
- 2 5. Section 09 51 13 "Acoustical Panel Ceilings" for vendor stall canopy panels.
- 3 6. Section 09 91 23 "Interior Painting" for finish painting requirements.

4 **1.2 COORDINATION**

- 5 A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating
- 6 manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one
- 7 another.
- 8 B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting
- 9 drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor
- 10 bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items
- 11 to Project site in time for installation.

12 **1.3 ACTION SUBMITTALS**

- 13 A. Product Data: For the following:
- 14 1. Paint products.
- 15 2. Grout.
- 16 B. Sustainable Design Submittals:
- 17 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and
- 18 cost.
- 19 C. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of
- 20 metal fabrications and their connections. Show anchorage and accessory items.
- 21 D. Samples for Verification: For each type and finish of extruded nosing and tread.
- 22 E. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified
- 23 professional engineer responsible for their preparation.

24 **1.4 INFORMATIONAL SUBMITTALS**

- 25 A. Qualification Data: For professional engineer.
- 26 B. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with
- 27 requirements.
- 28 C. Welding certificates.
- 29 D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that
- 30 shop primers are compatible with topcoats.
- 31 E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

32 **1.5 QUALITY ASSURANCE**

- 33 A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural
- 34 Welding Code - Steel."
- 35 B. Welding Qualifications: Qualify procedures and personnel according to the following:
- 36 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- 37 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
- 38 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

39 **1.6 FIELD CONDITIONS**

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

42 **PART 2 - PRODUCTS**

43 **2.1 PERFORMANCE REQUIREMENTS**

- 44 A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality
- 45 Requirements," to design ladders.

- 1 B. Structural Performance of Aluminum Ladders: Aluminum ladders shall withstand the effects of loads and
2 stresses within limits and under conditions specified in ANSI A14.3.
3 C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting
4 on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure
5 of connections, and other detrimental effects.
6 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

7 **2.2 METALS**

- 8 A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal
9 fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks,
10 rolled trade names, or blemishes.
11 B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled
12 content not less than 25 percent.
13 C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
14 D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.
15 E. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
16 F. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

17 **2.3 FASTENERS**

- 18 A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-
19 plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls.
20 Select fasteners for type, grade, and class required.
21 1. Provide stainless-steel fasteners for fastening aluminum.
22 2. Provide stainless-steel fasteners for fastening stainless steel.
23 B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated;
24 galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel.
25 Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
26 C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
27 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or
28 ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
29 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel
30 bolts, ASTM F 593, and nuts, ASTM F 594.
31 D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-
32 4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more
33 than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-
34 plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

35 **2.4 MISCELLANEOUS MATERIALS**

- 36 A. Shop Primers (Exposed to view locations): Provide primers that comply with Section 09 91 13 "Exterior
37 Painting," and Section 09 91 23 "Interior Painting".
38 B. Water-Based Primer (interior concealed locations): Emulsion type, anticorrosive primer for mildly corrosive
39 environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and
40 compatible with topcoat.
41 C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with
42 paints specified to be used over it.
43 D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
44 E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying
45 with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and
46 exterior applications.
47 F. Concrete for steel bollards, bollard footings: Comply with requirements in Section 03 30 00 "Cast-in-Place
48 Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000
49 psi.

50 **2.5 FABRICATION, GENERAL**

- 51 A. Refer to Material ID List for metal fabrications of this section.
52 B. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain
53 structural value of joined pieces.

- 1 C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough
2 areas on exposed surfaces.
- 3 D. Weld corners and seams continuously to comply with the following:
- 4 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance
5 of base metals.
- 6 2. Obtain fusion without undercut or overlap.
- 7 3. Remove welding flux immediately.
- 8 4. At exposed connections, finish exposed welds and surfaces smooth and blended.
- 9 E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where
10 possible. Locate joints where least conspicuous.
- 11 F. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide
12 weep holes where water may accumulate.
- 13 G. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel
14 strap anchors not less than 8 inches from ends and corners of units and 24 inches o.c.

15 **2.6 MISCELLANEOUS FRAMING AND SUPPORTS**

- 16 A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- 17 B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated.
18 Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

19 **2.7 SLIDING HARDWARE FOR SLIDING INTERIOR PANELS.**

- 20 A. Salvaged curtainwall re-use with sliding hardware for sliding interior panels.
- 21 1. Refer to Section 02 41 19 for salvage, repair and cleaning of salvaged curtainwall for repurposed
22 sliding interior panels.
- 23 2. Refer to Drawings for hardware, miscellaneous steel plates and steel sections for installation of
24 sliding interior panels. Includes but limited to:
- 25 a. BOLT-1: Heavy-Duty Cane Bolt.
- 26 1) Model: ABB-520-300-GARAGEBOLT
- 27 2) Size: 12-1/2 inches.
- 28 3) Material: Steel.
- 29 4) Finish: Black.
- 30 5) Accessory: Ground Plate.

31 **2.8 SHELF ANGLES.**

- 32 A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide
33 horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches
34 o.c., unless otherwise indicated.
- 35 B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- 36 C. Galvanize shelf angles located in exterior walls.
- 37 D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place
38 concrete.

39 **2.9 METAL FLOOR PLATE**

- 40 A. Fabricate from abrasive-surface floor plate of thickness indicated below:
- 41 1. Thickness: 1/4 inch.
- 42 B. Provide steel angle supports as indicated.
- 43 C. Provide flush steel bar drop handles for lifting removable sections, one at each end of each section.

44 **2.10 MISCELLANEOUS STEEL TRIM**

- 45 A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with
46 continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where
47 possible.
- 48 B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

- 1 **2.11 METAL BOLLARDS (BOLL-2)**
2 A. Fabricate metal bollards from Schedule 40 steel pipe
3 1. Concrete fill.
4 B. Prime bollards with zinc-rich primer.
- 5 **2.12 LOOSE BEARING AND LEVELING PLATES**
6 A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill
7 plates to receive anchor bolts and for grouting.
- 8 **2.13 METAL SHIPS' LADDERS (STAIR-2)**
- 9 A. Provide metal ships' ladders where indicated. Fabricate of open-type construction with channel or plate
10 stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.
11 1. Treads shall be not less than 5 inches (127 mm) exclusive of nosing or less than 8-1/2 inches (216
12 mm) including the nosing, and riser height shall be not more than 9-1/2 inches (241 mm).
13 2. Fabricate ships' ladders, including railings from steel.
14 3. Fabricate treads from welded or pressure-locked steel bar grating. Limit openings in gratings to no
15 more than in least dimension.
16 4. Comply with applicable railing requirements in Section 055213 "Pipe and Tube Railings."
- 17 B. Galvanize exterior steel ships' ladders, including treads, railings, brackets, and fasteners.
- 18 C. Prime interior steel ships' ladders, including treads, railings, brackets, and fasteners, with shop primer.
- 19 **2.14 EXTERIOR TRASH ENCLOSURE**
20 A. Exterior Trash Enclosure: Structural tube framing and steel panel infill.
21 B. Perforated metal Panel Infill (**MTLPNL-5**):
22 1. Basis of Design: McNichols Lattice 1253 Model No: 16870012M7.
23 2. Pattern: 1/2 inch Square On 11/16 inch Center: 53% Open.
24 3. Gauge: 12.
25 4. Finish: Galvanized and site painted.
26 C. Heavy Duty Continuous Hinge (**HINGE-1**)
27 1. Monroe PMP steel 84 inches, no fastener pre-drilled holes.
28 D. Heavy Duty Rigid caster Wheel (**WHEEL-1**):
29 1. Fairbanks #152232817, 8 inches, 1220 lbs capacity.
- 30 **2.15 SAFETY RAIL (RAIL-4)**
31 A. Manufacturer: Wire Crafters.
32 1. Product: Industrial safety handrail.
33 2. Configuration: 42 inches high with 2 intermediate horizontal rails
34 3. Delegated design for force resisting posts, rails and floor anchors.
35 4. Profile: Square tube.
36 5. Color: Black
37 6. Kick Plate: 4 inches high.
- 38 **2.16 STEEL WELD PLATES AND ANGLES**
39 A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete
40 construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded
41 steel strap anchors for embedding in concrete.
- 42 **2.17 FINISHES, GENERAL**
43 A. Finish metal fabrications after assembly.

- 1 **2.18 STEEL AND IRON FINISHES**
- 2 A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron
- 3 hardware and with ASTM A 123/A 123M for other steel and iron products.
- 4 B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete,
- 5 sprayed-on fireproofing, or masonry, or unless otherwise indicated.
- 6 C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
- 7 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- 8 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- 9 3. Other Items: SSPC-SP 3, "Power Tool Cleaning."

10 **PART 3 - EXECUTION**

- 11 **3.1 INSTALLATION, GENERAL**
- 12 A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications.
- 13 Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb,
- 14 true, and free of rack; and measured from established lines and levels.
- 15 B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left
- 16 as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or
- 17 abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or
- 18 screwed field connections.
- 19 C. Field Welding: Comply with the following requirements:
- 20 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance
- 21 of base metals.
- 22 2. Obtain fusion without undercut or overlap.
- 23 3. Remove welding flux immediately.
- 24 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness
- 25 shows after finishing and contour of welded surface matches that of adjacent surface.
- 26 D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are
- 27 required to be fastened to in-place construction.
- 28 E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or
- 29 similar construction.

- 30 **3.2 INSTALLING METAL BOLLARDS**
- 31 A. Anchor pedestrian control bollards as indicated on the drawings.
- 32 B. Anchor vehicle drive bollards in place with concrete footings. Place concrete and vibrate or tamp for
- 33 consolidation. Support and brace bollards in position until concrete has cured.
- 34 C. Fill bollards solidly with concrete, mounding top surface to shed water.

- 35 **3.3 INSTALLING BEARING AND LEVELING PLATES**
- 36 A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to
- 37 surfaces. Clean bottom surface of plates.
- 38 B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been
- 39 positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush
- 40 with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces
- 41 and plates to ensure that no voids remain.

- 42 **3.4 ADJUSTING AND CLEANING**
- 43 A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas.
- 44 Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-
- 45 PA 1 for touching up shop-painted surfaces.
- 46 B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to
- 47 comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 05 51 13
METAL PAN STAIRS

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21 **PART 1 - GENERAL**

22 **1.1 RELATED DOCUMENTS**

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

25 **1.2 SUMMARY**

- 26 A. Section Includes:
27 1. Preassembled steel stairs with concrete filled treads.
28 B. Related Sections:
29 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
30 2. Section 057300 "Decorative Metal Railings" for railings attached to metal stairs.
31 3. Section 057300 "Decorative Metal Railings" for handrails attached to walls adjacent to metal stairs.

32 **1.3 COORDINATION**

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

41 **1.4 ACTION SUBMITTALS**

- 42 A. Product Data: For metal pan stairs and the following:
43 1. Paint products.
44 B. Sustainable Design Submittals:
45 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and
46 cost.
47 C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
48 D. Delegated-Design Submittal: For stairs and railings, including analysis data signed and sealed by the
49 qualified professional engineer licensed in the State of Wisconsin responsible for their preparation.

50 **1.5 INFORMATIONAL SUBMITTALS**

- 51 A. Welding certificates.
52 B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that
53 shop primers are compatible with topcoats.

1 **1.6 QUALITY ASSURANCE**

- 2 A. Installer Qualifications: Fabricator of products.
3 B. Welding Qualifications: Qualify procedures and personnel according to the following:
4 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
5 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

6 **PART 2 - PRODUCTS**

7 **2.1 PERFORMANCE REQUIREMENTS**

- 8 A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality
9 Requirements," to design stairs and railings.
10 B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following
11 loads and stresses within limits and under conditions indicated:
12 1. Uniform Load: 100 lbf/sq. ft.
13 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
14 3. Uniform and concentrated loads need not be assumed to act concurrently.
15 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads
16 specified above.

17 **2.2 METALS**

- 18 A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For
19 components exposed to view in the completed Work, provide materials without seam marks, roller marks,
20 rolled trade names, or blemishes.
21 B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled
22 content not less than 25 percent.
23 C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
24 D. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural
25 steel, Grade 25, unless another grade is required by design loads; exposed.

26 **2.3 FASTENERS**

- 27 A. Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 12 for
28 exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class
29 required.

30 **2.4 MISCELLANEOUS MATERIALS**

- 31 A. Shop Primers: Provide primers that comply with Section 09 91 23 "Interior Painting,"
32 B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
33 C. Welded Wire Reinforcement: ASTM A 185/A 185M, 6 by 6 inches, W1.4 by W1.4, unless otherwise
34 indicated.

35 **2.5 FABRICATION, GENERAL**

- 36 A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing
37 plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
38 1. Join components by welding unless otherwise indicated.
39 2. Use connections that maintain structural value of joined pieces.
40 B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as
41 necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated
42 installation.
43 C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of
44 approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
45 D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing
46 work.
47 E. Weld connections to comply with the following:
48 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance
49 of base metals.
50 2. Obtain fusion without undercut or overlap.
51 3. Remove welding flux immediately.
52 4. Weld exposed corners and seams continuously unless otherwise indicated.
53 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish
54 Standards" for Type 3 welds: partially dressed weld with spatter removed.

- 1 F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
2 Locate joints where least conspicuous.

3 **2.6 STEEL-FRAMED STAIRS (STAIR-1)**

- 4 A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs"
5 in NAAMM AMP 510, "Metal Stairs Manual," Commercial Class, unless more stringent requirements are
6 indicated.
7 B. Stair Framing:
8 1. Fabricate stringers of steel channels.
9 a. Provide closures for exposed ends of channel stringers.
10 2. Construct platforms of steel channel headers and miscellaneous framing members as needed to
11 comply with performance requirements.
12 3. Weld stringers to headers; weld framing members to stringers and headers.
13 4. Where stairs are enclosed by gypsum board assemblies, provide hanger rods or struts to support
14 landings from floor construction above or below. Locate hanger rods and struts where they do not
15 encroach on required stair width and are within the fire-resistance-rated stair enclosure.
16 5. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting
17 steel stair components before installing masonry.
18 C. Metal Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of
19 thickness needed to comply with performance requirements, but not less than 0.067 inch.

20 **2.7 FINISHES**

- 21 A. Finish metal stairs after assembly.
22 B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power
23 Tool Cleaning."
24 C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes
25 and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1,
26 "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

27 **PART 3 - EXECUTION**

28 **3.1 INSTALLING METAL PAN STAIRS**

- 29 A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set
30 units accurately in location, alignment, and elevation, measured from established lines and levels and free
31 of rack.
32 B. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless
33 otherwise indicated.
34 C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left
35 as exposed joints.
36 D. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.
37 E. Place and finish concrete fill for treads and platforms to comply with Section 03 30 00 "Cast-in-Place
38 Concrete."
39 1. Install abrasive nosings with anchors fully embedded in concrete.

40 **3.2 ADJUSTING AND CLEANING**

- 41 A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of
42 shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-
43 PA 1 for touching up shop-painted surfaces.

44 **END OF SECTION**

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SECTION 05 52 13
PIPE AND TUBE RAILINGS

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26 **PART 1 - GENERAL**

27 **1.1 SUMMARY**

- 28 A. Section Includes:
- 29 1. Steel pipe and tube railings.
- 30 B. Related Requirements:
- 31 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 32 2. Section 05 51 12 "Metal Pan Stairs" for steel tube railings associated with metal pan stairs.
 - 33 3. Section 05 73 00 "Decorative Metal Railings" for RAIL 2 and CANE RAIL.

34 **1.2 COORDINATION**

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

43 **1.3 ACTION SUBMITTALS**

- 44 A. Product Data: For the following:
- 45 1. Manufacturer's product lines of mechanically connected railings.
 - 46 2. Railing brackets.
 - 47 3. Grout, anchoring cement, and paint products.
- 48 B. Sustainable Design Submittals:
- 49 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
50 and cost.
- 51 C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- 52 D. Samples: For each type of exposed finish required.
- 53 E. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified
54 professional engineer licensed in the State of Wisconsin responsible for their preparation.

1 **1.4 INFORMATIONAL SUBMITTALS**

- 2 A. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency,
3 according to ASTM E 894 and ASTM E 935.

4 **1.5 QUALITY ASSURANCE**

- 5 A. Welding Qualifications: Qualify procedures and personnel according to the following:
6 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
7 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
8 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

9 **1.6 DELIVERY, STORAGE, AND HANDLING**

- 10 A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary
11 protective covering before shipping.

12 **1.7 FIELD CONDITIONS**

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

15 **PART 2 - PRODUCTS**

16 **2.1 MANUFACTURERS**

- 17 A. Steel Pipe and Tube Railings:
18 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
19 that may be incorporated into the Work include, but are not limited to, the following:
20 a. Wagner, R & B, Inc.
21 b. Wire Crafters
22 c. McMaster-Carr
23 d. Steele Solutions, Inc.

24 **2.2 PERFORMANCE REQUIREMENTS**

- 25 A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality
26 Requirements," to design railings, including attachment to building construction.
27 B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects
28 of gravity loads and the following loads and stresses within limits and under conditions indicated:
29 1. Handrails and Top Rails of Guards:
30 a. Uniform load of 50 lbf/ ft. applied in any direction.
31 b. Concentrated load of 200 lbf applied in any direction.
32 c. Uniform and concentrated loads need not be assumed to act concurrently.
33 2. Infill of Guards:
34 a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
35 b. Infill load and other loads need not be assumed to act concurrently.

36 **2.3 STEEL PIPE AND TUBE RAILINGS**

- 37 A. Stair Hand Railings at Wall (**RAIL-1**):
38 1. Tube Handrail at Wall: Refer to Drawings.
39 B. Safety Railing (**RAIL-3**):
40 1. Basis of Design: Wire Crafters; Industrial Safety Handrail
41 2. Configuration: 42 inches high with 2 intermediate horizontal rails
42 3. Profile: Square tube
43 4. Color: Black
44 5. Kick Plate: 4 inches high;

45 **2.4 METALS, GENERAL**

- 46 A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported
47 rails unless otherwise indicated.
48 1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and
49 that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

- 1 **2.5 STEEL AND IRON**
2 A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer
3 recycled content not less than [25] <Insert value> percent.
4 B. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
5 C. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another
6 grade and weight are required by structural loads.
7 1. Provide galvanized finish for exterior installations and where indicated.
8 D. Plates, Shapes, and Bars: ASTM A 36/A 36M.
9 E. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise
10 indicated.
11 F. Woven-Wire Mesh: Intermediate-crimp, square pattern, 2-inch woven-wire mesh, made from 0.134-inch-
12 diameter wire complying with ASTM A 510.

- 13 **2.6 FASTENERS**
14 A. General: Provide the following:
15 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941,
16 Class Fe/Zn 5 for zinc coating.
17 2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners
18 complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
19 B. Post-Installed Anchors: [Torque-controlled expansion anchors] [or] [chemical anchors] capable of
20 sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4
21 times the load imposed when installed in concrete, as determined by testing according to
22 ASTM E 488/E 488M, conducted by a qualified independent testing agency.
23 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or
24 ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

- 25 **2.7 MISCELLANEOUS MATERIALS**
26 A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
27 B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
28 C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with
29 paints specified to be used over it.
30 D. Shop Primers: Provide primers that comply with Section 09 91 13 "Exterior Painting" and Section 09 91 23
31 "Interior Painting."
32 E. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying
33 with MPI#79 and compatible with topcoat.
34 F. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
35 G. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and
36 compatible with finish paint systems indicated.
37 H. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
38 I. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
39 J. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
40 K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying
41 with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and
42 exterior applications.

- 43 **2.8 FABRICATION**
44 A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of
45 approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
46 B. Form work true to line and level with accurate angles and surfaces.
47 C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this
48 purpose. Weld all around at connections, including at fittings.
49 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance
50 of base metals.
51 2. Obtain fusion without undercut or overlap.
52 3. Remove flux immediately.
53 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows
54 after finishing and welded surface matches contours of adjoining surfaces.
55 D. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed
56 internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket
57 fittings.
58 E. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate
59 members and fittings to produce flush, smooth, rigid, hairline joints.

- 1 F. Form changes in direction by bending or by inserting prefabricated elbow fittings.
- 2 G. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive
- 3 configuration required. Maintain cross section of member throughout entire bend without buckling, twisting,
- 4 cracking, or otherwise deforming exposed surfaces of components.
- 5 H. Close exposed ends of railing members with prefabricated end fittings.
- 6 I. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
- 7 J. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and
- 8 anchors to interconnect railing members to other work unless otherwise indicated.
- 9 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant
- 10 fillers or other means to transfer loads through wall finishes to structural supports and prevent
- 11 bracket or fitting rotation and crushing of substrate.
- 12 K. Woven-Wire Mesh Infill Panels: Fabricate infill panels from woven-wire mesh crimped into 1-by-1/2-by-1/8-
- 13 inch metal channel frames. Make wire mesh and frames from same metal as railings in which they are
- 14 installed.
- 15 1. Orient wire mesh with wires horizontal and vertical.

16 2.9 STEEL AND IRON FINISHES

- 17 A. Galvanized Railings:
 - 18 1. Hot-dip galvanize exterior steel railings, including hardware, after fabrication.
 - 19 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
 - 20 3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
- 21 B. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt,
- 22 oil, flux, and other foreign matter, and treat with etching cleaner.
- 23 C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE
- 24 No. 3, "Commercial Blast Cleaning."
- 25 D. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply
- 26 with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting.
- 27 Primer need not be applied to surfaces to be embedded in concrete or masonry.
- 28 1. Do not apply primer to galvanized surfaces.
- 29 E. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated
- 30 surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1,
- 31 "Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates
- 32 recommended by coating manufacturer.
- 33 1. Color: As selected by Architect from manufacturer's full range.

34 PART 3 - EXECUTION

35 3.1 INSTALLATION, GENERAL

- 36 A. Set railings accurately in location, alignment, and elevation; measured from established lines and levels
- 37 and free of rack.
 - 38 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after
 - 39 fabrication and that are intended for field connection by mechanical or other means without further
 - 40 cutting or fitting.
 - 41 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 42 3. Align rails so variations from level for horizontal members and variations from parallel with rake of
 - 43 steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- 44 B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other
- 45 materials from direct contact with incompatible materials.
 - 46 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact
 - 47 with grout, concrete, masonry, wood, or dissimilar metals.

48 3.2 ANCHORING POSTS

- 49 A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into
- 50 sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring
- 51 cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- 52 B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts
- 53 in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete
- 54 with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring
- 55 material manufacturer's written instructions.

- 1 C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions,
2 connected to posts and to metal supporting members.

3 **3.3 ATTACHING RAILINGS**

- 4 A. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated
5 or, if not indicated, at spacing required to support structural loads.

- 6 B. Secure wall brackets and railing end flanges to building construction as follows:

- 7 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag
8 bolts.
9 2. For hollow masonry anchorage, use toggle bolts.
10 3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs.
11 Coordinate with carpentry work to locate backing members.
12 4. For steel-framed partitions, use hanger or lag bolts set into fire-retardant-treated wood backing
13 between studs. Coordinate with stud installation to locate backing members.
14 5. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel
15 reinforcements.
16 6. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through
17 concealed steel reinforcements.

18 **3.4 ADJUSTING AND CLEANING**

- 19 A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of
20 shop paint, and paint exposed areas with the same material as used for shop painting to comply with
21 SSPC-PA 1 requirements for touching up shop-painted surfaces.

- 22 B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to
23 comply with ASTM A 780/A 780M.
24

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SECTION 05 73 00
DECORATIVE METAL RAILINGS

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25 **PART 1 - GENERAL**

26 **1.1 RELATED DOCUMENTS**

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

29 **1.2 SUMMARY**

- 30 A. Section Includes:
31 1. Steel handrails at interior stairs (**RAIL-2**).
32 2. Cane rails at interior (**CANE RAIL**).
33 B. Related Sections:
34 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
35 2. Section 05 52 13 "Pipe and Tube Railings" for RAIL-1 and RAIL-3.
36 3. Section 12 36 16 "Metal Countertops" for countertops attached to railing system.

37 **1.3 DEFINITIONS**

- 38 A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas
39 and for pedestrian guidance and support, visual separation, or wall protection.

40 **1.4 COORDINATION AND SCHEDULING**

- 41 A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating
42 manufacturers' written instructions to ensure that shop primers and topcoats are compatible.
43 B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for
44 installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that
45 are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.
46 C. Schedule installation so wall attachments are made only to completed walls. Do not support railings
47 temporarily by any means that do not meet structural performance requirements.

48 **1.5 PREINSTALLATION MEETINGS**

- 49 A. Preinstallation Conference: Conduct conference at Project site.
50

- 1 **1.6 ACTION SUBMITTALS**
- 2 A. Product Data: For the following:
- 3 1. Manufacturer's product lines of railings assembled from standard components.
- 4 2. Grout, anchoring cement, and paint products.
- 5 B. Sustainable Design Submittals:
- 6 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and
- 7 cost.
- 8 2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
- 9 C. Shop Drawings: Include plans, elevations, sections, and attachment details.
- 10 D. Samples: For each type of exposed finish required.
- 11 E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and
- 12 design criteria, including analysis data signed and sealed by the qualified professional engineer licensed in
- 13 the State of Wisconsin responsible for their preparation.
- 14 **1.7 INFORMATIONAL SUBMITTALS**
- 15 A. Qualification Data: For professional engineer.
- 16 B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency,
- 17 according to ASTM E 894 and ASTM E 935.
- 18 C. Preconstruction test reports.
- 19 D. Evaluation Reports: For post-installed anchors, from ICC-ES.
- 20 **1.8 QUALITY ASSURANCE**
- 21 A. Welding Qualifications: Qualify procedures and personnel according to the following:
- 22 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- 23 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
- 24 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."
- 25 B. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete a
- 26 mockup submittal for review.
- 27 1. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate
- 28 aesthetic effects, and to set quality standards for fabrication and installation.
- 29 a. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area,
- 30 and anchorage system components.
- 31 b. Subject to compliance with requirements, approved mockups may become part of the
- 32 completed Work if undisturbed at time of Substantial Completion.
- 33 **1.9 FIELD CONDITIONS**
- 34 A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field
- 35 measurements before fabrication and indicate measurements on Shop Drawings.

36 **PART 2 - PRODUCTS**

- 37 **2.1 MANUFACTURERS**
- 38 A. Steel and Iron Decorative Railings:
- 39 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
- 40 that may be incorporated into the Work include, but are not limited to the following:
- 41 a. Architectural Iron Designs, Inc.
- 42 b. Braun, J. G., Company; The Wagner Companies.
- 43 B. Product Options: Information on Drawings and in Specifications establishes requirements for system's
- 44 aesthetic effects and performance characteristics.
- 45 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's
- 46 approval.
- 47

- 1 **2.2 PERFORMANCE REQUIREMENTS**
2 A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality
3 Requirements," to design railings, including attachment to building construction.
4 B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects
5 of gravity loads and the following loads and stresses within limits and under conditions indicated:
6 1. Handrails and Top Rails of Guards:
7 a. Uniform load of 50 lbf/ft. applied in any direction.
8 b. Concentrated load of 200 lbf applied in any direction.
9 c. Uniform and concentrated loads need not be assumed to act concurrently.
10 2. Infill of Guards:
11 a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
12 b. Infill load and other loads need not be assumed to act concurrently.

- 13 **2.3 METALS, GENERAL**
14 A. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
15 B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled
16 content not less than 25 percent.

- 17 **2.4 STEEL GURAD RAILS AND HANDRAILS (RAIL-2)**
18 A. Tubing: ASTM A 500/A 500M (cold formed) or ASTM A 513.
19 B. Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
20 C. Plates, Shapes, and Bars: ASTM A 36/A 36
21 D. Infill: Perforated Metal Square (**MTLPNL-2**): 5/16 inch square on 1/2 inch center: 39% open.
22 1. Basis of Design: McNichols No: 36B2135048.
23 2. Material: Carbon Steel.
24 3. Gage: 10 Ga Wire (.135 inch).
25 4. Finish: Prefinished custom powder coat to match color PT-B.
26 5. Provide rake, transition, and rectangular panels with infill precut and assembled with frame as per
27 drawings infill pattern: square 2 inches x 2 Inches welded wire mesh.
28 6. Frame: Refer to Drawings.
29 E. Refer to the drawings for extent and profiles.
30 F. Where indicated at open stairs provide integrated handrail to match (**RAIL-3**). Refer to Drawings.

- 31 **2.5 FASTENERS**
32 A. Fastener Materials: Unless otherwise indicated, provide the following:
33 1. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25
34 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where
35 exposed.
36 3. Dissimilar Metals: Type 316 stainless-steel fasteners.
37 B. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load,
38 according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.
39 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or
40 ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
41 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel
42 bolts, ASTM F 593, and nuts, ASTM F 594.

- 43 **2.6 MISCELLANEOUS MATERIALS**
44 A. Interior Materials:
45 1. Shop Primers: Provide primers that comply with Section 09 91 23 "Interior Painting."
46 B. Exterior materials:
47 4. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with intermediate and topcoat.
48 C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying
49 with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and
50 exterior applications.

- 51 **2.7 FABRICATION**
52 A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and
53 spacing, details, finish, and anchorage, but not less than that required to support structural loads.
54 B. Connections: Fabricate railings with welded connections unless otherwise indicated.
55

- 1 C. Welded Connections: Cope components at connections to provide close fit. Weld all around at connections,
2 including at fittings.
- 3 1. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish
4 Standards" for Type 1 welds; no evidence of a welded joint.
- 5 D. Form changes in direction by bending
- 6 E. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section
7 of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed
8 surfaces of components.
- 9 F. Close exposed ends of hollow handrail members with prefabricated end fittings.
- 10 G. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
- 11 H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors
12 to interconnect railing members to other work unless otherwise indicated.

13 **2.8 STEEL AND IRON FINISHES**

- 14 A. Preparing Nongalvanized Items for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with
15 SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- 16 1.
- 17 1. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated.
18 Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and
19 Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be
20 embedded in concrete or masonry.

21 **PART 3 - EXECUTION**

22 **3.1 INSTALLATION**

- 23 A. Fit exposed connections together to form tight, hairline joints.
- 24 B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location,
25 alignment, and elevation; measured from established lines and levels and free of rack.
- 26 1. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
- 27 2. Align rails so variations from level for horizontal members and variations from parallel with rake of
28 steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- 29 C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other
30 materials from direct contact with incompatible materials.
- 31 1. Coat concealed surfaces that will be in contact with grout, concrete, masonry, wood, or dissimilar
32 metals, with a heavy coat of bituminous paint.
- 33 D. Post anchorage: Refer to Drawings for type indicated.
- 34 1. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been
35 inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout.
- 36 2. Anchor posts to existing surfaces with baseplates as required by conditions, connected to posts and
37 to supporting surfaces. Fasten to support surfaces with stainless steel bolts and post installed
38 sleeves.
- 39 E. Anchor railing ends to concrete and masonry with sleeves concealed within railing ends and anchored to
40 wall construction with anchors and bolts.
- 41 F. Attach handrails to walls with wall brackets except where end flanges are used.
- 42 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
- 43 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

44 **3.2 CLEANING**

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

49 **3.3 PROTECTION**

- 50 A. Protect finishes of railings from damage during construction period with temporary protective coverings
51 approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- 52 B. Restore finishes damaged during installation and construction period so no evidence remains of correction
53 work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish
54 entire unit, or provide new units.

55 **END OF SECTION**

SECTION 05 75 00
DECORATIVE FORMED METAL

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27 **PART 1 - GENERAL**

28 **1.1 RELATED DOCUMENTS**

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

31 **1.2 SUMMARY**

- 32 A. Section Includes:
- 33 1. Panels and panel trim for vendor stall canopy.
 - 34 2. Filler panels between dissimilar constructions.
- 35 B. Related Requirements:
- 36 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 37 2. Section 05 12 13 "Architecturally Exposed Structural Steel Framing" supporting slotted channel grid
38 for vendor stall canopy.
 - 39 3. Section 05 45 00 "Equipment Support Systems" for slotted channel grid suspended from
40 architecturally exposed steel framing.
 - 41 4. Section 09 51 13 "Acoustical Panel Ceilings" for vendor stall canopy panels.
 - 42 5. Section 09 91 23 "Interior Painting" for finish painting requirements.

43 **1.3 COORDINATION**

- 44 A. Coordinate installation of anchorages for decorative formed metal items. Furnish setting drawings,
45 templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and
46 items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in
47 time for installation.
- 48 B. Coordinate installation of decorative formed metal with adjacent construction to ensure that wall assemblies,
49 flashings, trim, and joint sealants, are protected against damage from the effects of weather, age, corrosion,
50 and other causes of deterioration.

- 1 **1.4 PREINSTALLATION MEETINGS**
- 2 A. Preinstallation Conference: Conduct conference at Project site.
- 3 **1.5 ACTION SUBMITTALS**
- 4 A. Product Data: For each type of product, including finishing materials.
- 5 B. Sustainable Design Submittals:
- 6 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and
- 7 cost.
- 8 C. Shop Drawings: Show fabrication and installation details for decorative formed metal.
- 9 1. Include plans, elevations, component details, and attachment details.
- 10 2. Indicate materials and profiles of each decorative formed metal member, fittings, joinery, finishes,
- 11 fasteners, anchorages, and accessory items.
- 12 D. Samples: For each type of exposed finish required, prepared on 6-inch-square Samples of metal of same
- 13 thickness and material indicated for the Work.
- 14 **1.6 INFORMATIONAL SUBMITTALS**
- 15 A. Coordination Drawings: For decorative formed metal elements that house items specified in other Sections.
- 16 Show dimensions of housed items, including locations of housing penetrations and attachments, and
- 17 necessary clearances.
- 18 B. Evaluation Reports: For post-installed anchors, from ICC-ES.
- 19 **1.7 CLOSEOUT SUBMITTALS**
- 20 A. Maintenance Data: For to include in maintenance manuals.
- 21 **1.8 QUALITY ASSURANCE**
- 22 A. Fabricator Qualifications: A firm experienced in producing decorative formed metal similar to that indicated
- 23 for this Project and with a record of successful in-service performance as well as sufficient production
- 24 capacity to produce required units.
- 25 B. Organic-Coating Applicator Qualifications: A firm experienced in successfully applying organic coatings of
- 26 type indicated to metals of types indicated and that employs competent control personnel to conduct
- 27 continuing, effective quality-control program to ensure compliance with requirements.
- 28 C. Anodic Finisher Qualifications: A firm experienced in successfully applying anodic finishes of type indicated
- 29 and that employs competent control personnel to conduct continuing, effective quality-control program to
- 30 ensure compliance with requirements.
- 31 D. Powder-Coating Applicator Qualifications: A firm experienced in successfully applying powder coatings of
- 32 type indicated to metals of types indicated and that employs competent control personnel to conduct
- 33 continuing, effective quality-control program to ensure compliance with requirements.
- 34 E. Installer Qualifications: Fabricator of products.
- 35 F. Mockups: Build assembly mockups of AESS and elements supported to set quality standards for fabrication
- 36 and installation of entire assembly.
- 37 1. Build mockup of typical portion of complete composite vendor stall canopy as shown on Drawings.
- 38 Provide supporting steel grid.
- 39 2. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete a
- 40 mockup submittal for review.
- 41 3. Subject to compliance with requirements, approved mockups may become part of the completed
- 42 Work if undisturbed at time of Substantial Completion.
- 43 **1.9 DELIVERY, STORAGE, AND HANDLING**
- 44 A. Deliver decorative formed metal products wrapped in protective coverings and strapped together in suitable
- 45 packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.
- 46 B. Store products on elevated platforms in a dry location.
- 47 **1.10 FIELD CONDITIONS**
- 48 A. Field Measurements: Verify actual locations of walls, columns, beams, and other construction contiguous
- 49 with decorative formed metal by field measurements before fabrication and indicate measurements on Shop
- 50 Drawings.

1 **PART 2 - PRODUCTS**

2 **2.1 SHEET METAL**

- 3 A. General: Fabricate products from sheet metal without pitting, seam marks, roller marks, stains,
4 discolorations, or other imperfections where exposed to view on finished units.
- 5 B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled
6 content not less than 25 percent.
- 7 C. Steel Sheet: electrolytic zinc-coated, ASTM A 879/A 879M, with steel sheet substrate complying with
8 ASTM A 1008/A 1008M, commercial steel, exposed.
- 9 D. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 316, stretcher-leveled standard of
10 flatness.
- 11 E. Perforated Metal Panel (**MTLPNL-1**)
- 12 1. Perforated Metal Square
- 13 2. Product: McNichols 16961218; Pattern: 5/16 inch square on 1/2 inch center: 39% open.
- 14 3. Material: carbon steel; 18 gage.
- 15 4. Finish Paint PT-7.
- 16 F. Welded Wire Mesh Infill (**MTLPNL-2**)
- 17 1. Perforated Metal Square
- 18 2. Product: McNichols 3620190048
- 19 3. Pattern: Square 2 inches by 2 inches.
- 20 4. Material: carbon steel; 6 1/4 gage.
- 21 5. Finish high performance paint to match paint PT8.
- 22 G. Perforated Metal Panel (**MTLPNL-5**)
- 23 1. Product: Lattice 1253. #16870012M7. 1/2 inch square on 11/16 inch center: 53% open.
- 24 2. Material: Galvanized carbon steel; 12 gage.
- 25 3. Finish Field Paint.

26 **2.2 MISCELLANEOUS MATERIALS**

- 27 A. Glass-Fiber Acoustic Board (**ACPNL-1**): ASTM C612, Type IA; gray/black fiber glass core with a black mat
28 finish. Maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84.
- 29 1. Water Vapor Sorption (ASTM C1104): Less than 3% by weight.
- 30 2. Fungi Resistance (ASTM C 1338): Meets Requirement.
- 31 3. Acoustic Performance: Octave Band Frequencies, Hz. 2 inches Mat Faced (ASTM C 423. Type A
32 mounting):
- | | | | | | | | |
|-------|------|------|------|------|------|------|------|
| 33 a. | 125 | 250 | 500 | 1000 | 2000 | 4000 | NRC |
| 34 b. | 0.18 | 0.71 | 1.12 | 1.12 | 1.03 | 1.02 | 1.00 |
- 35 B. Gaskets: As required to seal joints in decorative formed metal and remain weathertight; as recommended
36 in writing by decorative formed metal manufacturer.
- 37 1. ASTM D 1056, Type 1, Class A, grade as recommended by gasket manufacturer to obtain seal for
38 application indicated.
- 39 2. Closed-cell polyurethane foam, adhesive on two sides, release paper protected.
- 40 C. Sealants, Exterior: Elastomeric sealant complying with Section 07 92 00 "Joint Sealants" and as
41 recommended in writing by decorative formed metal manufacturer.
- 42 D. Sealants, Interior: Nonsag, paintable sealant complying with Section 07 92 00 "Joint Sealants" and as
43 recommended in writing by decorative formed metal manufacturer.
- 44 E. Filler Metal and Electrodes: Provide type and alloy of filler metal and electrodes as necessary for strength,
45 corrosion resistance, and compatibility in fabricated items.
- 46 1. Use filler metals that will match the color of metal being joined.
- 47 F. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated.
- 48 1. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise
49 indicated.
- 50 G. Anchors: Provide fastener systems with an evaluation report acceptable to authorities having jurisdiction,
51 based on ICC-ES AC193.
- 52 H. Anchor Materials:
- 53 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or
54 ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
- 55 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy **Group 2** stainless-steel
56 bolts, ASTM F 593, and nuts, ASTM F 594.
- 57

- 1 I. Sound-Deadening Materials:
- 2 1. Insulation: Unfaced, mineral-fiber blanket insulation complying with ASTM C 665, Type I, and
- 3 passing ASTM E 136 test.
- 4 2. Mastic: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- 5 J. Laminating Adhesive: Adhesive recommended by metal fabricator that will fully bond metal to metal and is
- 6 noncombustible after curing.
- 7 K. Isolation Coating: Manufacturer's standard bituminous paint.

8 2.3 SURFACE PREPARATION

- 9 A. Materials and Finish: Material and finish specifications for MTLPNL-1 and 2 are as follows:
- 10 1. Finish: Shop markings, laser etching, labeling, rust, scale, etc shall be removed prior to the
- 11 application of the finish.
- 12 2. Refer to Section 09 91 23 – Interior Painting for field finish scheduled for PT-7.
- 13 a. Cleaning & Prepping: Permalac NT Blackener is a thin, transparent coating. Darkening will
- 14 build with each successive coat. Permalac NT Blackener can be applied directly to steel
- 15 without a primer or undercoat. Mill scale and flash rust will not interfere with adhesion and
- 16 sealing. Remove mill oil. Provide SSPC SP-2 – Hand Tool Cleaning at a minimum.

17 2.4 PAINTS AND COATINGS

- 18 A. Painted Steel Finish for Field Painting (other than for PT-7):
- 19 1. Universal Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-
- 20 alkyd primer complying with MPI#79 and compatible with topcoat.

21 2.5 FABRICATION, GENERAL

- 22 A. Shop Assembly: Preassemble decorative formed metal items in shop to greatest extent possible to minimize
- 23 field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
- 24 Clearly mark units for reassembly and coordinated installation.
- 25 B. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch-wide hem on the concealed side,
- 26 or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.
- 27 C. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to
- 28 provide surface flatness and sufficient strength for indicated use.
- 29 1. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush
- 30 alignment.
- 31 D. Where welding or brazing is indicated, weld or braze joints and seams continuously. Grind, fill, and dress to
- 32 produce smooth, flush, exposed surfaces in which joints are not visible after finishing is completed.

33 2.6 CLOSURES AND TRIM

- 34 A. Form closures and trim from metal of type and thickness indicated below. Fabricate to fit tightly to adjoining
- 35 construction[, with weathertight joints at exterior installations].
- 36 1. Aluminum Sheet: 0.063 inch.
- 37 a. Finish: Baked enamel or powder coat.

38 2.7 GALVANIZED-STEEL SHEET FINISHES

- 39 A. Preparing Galvanized Items for Factory Priming: Thoroughly clean galvanized decorative formed metal of
- 40 grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- 41 B. Preparing Galvanized Items for Factory Finishing: Clean surfaces with nonpetroleum solvent so surfaces
- 42 are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic
- 43 coating to be applied over it.
- 44 C. Repairing Galvanized Surfaces: Clean welds and abraded areas and repair galvanizing to comply with
- 45 ASTM A 780/A 780M.
- 46 D. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply shop primer
- 47 to prepared surfaces of items unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint
- 48 Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
- 49 E. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard
- 50 thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils.
- 51 Prepare, treat, and coat metal to comply with resin manufacturer's written instructions.
- 52 1. Color and Gloss: <Insert color and gloss>.
- 53

- 1 **2.8 STEEL SHEET FINISHES**
2 A. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil,
3 grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from
4 uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or with SSPC-SP 8,
5 "Pickling."
6 B. Pretreatment: Immediately after cleaning, apply a conversion coating of type suited to organic coating.
7 C. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply shop primer
8 to prepared surfaces of items unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint
9 Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
10 D. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard
11 thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils.
12 Prepare, treat, and coat metal to comply with resin manufacturer's written instructions.
13 1. Color and Gloss: <Insert color and gloss>.
14

15 **PART 3 - EXECUTION**

- 16 **3.1 EXAMINATION**
17 A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for
18 installation tolerances and other conditions affecting performance of decorative formed metal.
19 B. Proceed with installation only after unsatisfactory conditions have been corrected.

- 20 **3.2 INSTALLATION**
21 A. Locate and place decorative formed metal items level and plumb and in alignment with adjacent
22 construction. Perform cutting, drilling, and fitting required to install decorative formed metal.
23 B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where needed
24 to protect metal surfaces and to make a weathertight connection.
25 C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for
26 sealants and joint fillers as indicated.
27 D. Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed
28 surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible
29 or could result in corrosion or deterioration of either material or finish.
30 E. Install decorative-formed-metal-clad doors and frames to comply with requirements specified in
31 Section 08 11 13 "Hollow Metal Doors and Frames."
32 F. Restore finishes damaged during installation and construction period so no evidence remains of correction
33 work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish
34 entire unit or provide new units.

- 35 **3.3 ADJUSTING AND CLEANING**
36 A. Unless otherwise indicated, clean metals by washing thoroughly with water and soap, rinsing with clean
37 water, and drying with soft cloths.
38 B. Clean copper alloys according to metal finisher's written instructions in a manner that leaves an undamaged
39 and uniform finish matching approved Sample.
40 C. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of
41 shop paint and paint exposed areas with the same material as used for shop painting to comply with SSPC-
42 PA 1 for touching up shop-painted surfaces.
43 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
44 D. Restore finishes damaged during installation and construction period so no evidence remains of correction
45 work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish
46 entire unit or provide new units.

- 47 **3.4 PROTECTION**
48 A. Protect finishes of decorative formed metal items from damage during construction period. Remove
49 temporary protective coverings at time of Substantial Completion.

50 **END OF SECTION**

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SECTION 06 10 00
ROUGH CARPENTRY

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22 **PART 1 - GENERAL**

23 **1.1 RELATED DOCUMENTS**

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

26 **1.2 SUMMARY**

- 27 A. Section Includes:
 - 28 1. Rooftop equipment bases and support curbs.
 - 29 2. Wood blocking, cants, and nailers.
 - 30 3. Wood furring and grounds.
 - 31 4. Plywood backing panels.
- 32 B. Related Sections:
 - 33 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

34 **1.3 DEFINITIONS**

- 35 A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.
- 36 B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) size or greater but less than 5 inches
- 37 nominal (114 mm actual) size in least dimension.
- 38 C. Exposed Framing: Framing not concealed by other construction.
- 39 D. OSB: Oriented strand board.

40 **1.4 ACTION SUBMITTALS**

- 41 A. Product Data: For each type of process and factory-fabricated product.
 - 42 1. Include data for wood-preservative treatment from chemical treatment manufacturer and
 - 43 certification by treating plant that treated materials comply with requirements. Indicate type of
 - 44 preservative used and net amount of preservative retained.
 - 45 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by
 - 46 treating plant that treated materials comply with requirements. Include physical properties of treated
 - 47 materials based on testing by a qualified independent testing agency.
 - 48 3. For fire-retardant treatments, include physical properties of treated lumber both before and after
 - 49 exposure to elevated temperatures, based on testing by a qualified independent testing agency
 - 50 according to ASTM D 5664.

- 1 4. For products receiving a waterborne treatment, include statement that moisture content of treated
2 materials was reduced to levels specified before shipment to Project site.
3 B. Sustainable Design Submittals:
4 1. Product Certificates: For regional materials, indicating location of material manufacturer and point
5 of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for
6 each regional material.
7 2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
8 3. Chain-of-Custody Qualification Data: For manufacturer and vendor.
9 4. Product Data: For composite wood products, indicating that product contains no urea
10 formaldehyde.
11 5. Product Data: For installation adhesives, indicating VOC content.

12 **1.5 INFORMATIONAL SUBMITTALS**

- 13 A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses.
14 Indicate species and grade selected for each use and design values approved by the ALSC Board of
15 Review.
16 B. Evaluation Reports: For the following, from ICC-ES:
17 1. Wood-preserved-treated wood.
18 2. Fire-retardant-treated wood.

19 **1.6 QUALITY ASSURANCE**

- 20 A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-
21 accredited certification body.
22 B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification
23 body.

24 **1.7 DELIVERY, STORAGE, AND HANDLING**

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

28 **PART 2 - PRODUCTS**

29 **2.1 WOOD PRODUCTS, GENERAL**

- 30 A. Regional Materials: The following wood products shall be manufactured within 500 miles of Project site
31 from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500
32 miles of Project site.
33 1. Dimension lumber, except treated materials.
34 B. Certified Wood: The following wood products shall be certified as "FSC Pure" or "FSC Mixed Credit"
35 according to FSC STD-01-00 and FSC STD-40-004.
36 1. Dimension lumber, except treated materials.
37 C. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated,
38 comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade
39 lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules
40 indicated.
41 1. Factory mark each piece of lumber with grade stamp of grading agency.
42 2. Dress lumber, S4S, unless otherwise indicated.
43 D. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less; 19 percent for
44 more than 2-inch nominal thickness unless otherwise indicated.

45 **2.2 WOOD-PRESERVATIVE-TREATED LUMBER**

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

- 1 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or
2 chromium. Do not use inorganic boron (SBX) for sill plates.
3 B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is
4 warped or that does not comply with requirements for untreated material.
5 C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
6 D. Application: Treat exterior items indicated on Drawings, and the following:
7 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in
8 connection with roofing, flashing, vapor barriers, and waterproofing.
9 a. Lumber treated with wood preservatives such as Pentachlorophenol, Copper Naphthenate
10 or Copper 8-quinolinolate that adversely affect the membrane when in direct contact not
11 acceptable.
12 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with
13 masonry or concrete.

14 **2.3 FIRE-RETARDANT-TREATED MATERIALS**

- 15 A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in
16 this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics
17 specified as determined by testing identical products per test method indicated by a qualified testing
18 agency.
19 B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of
20 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive
21 combustion when the test is extended an additional 20 minutes, and with the flame front not extending
22 more than 10.5 feet beyond the centerline of the burners at any time during the test.
23 1. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested
24 according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
25 C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after
26 treatment to maximum moisture content of 15 percent.
27 D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
28 E. Application: Treat all interior rough carpentry unless otherwise indicated.
29 1. Concealed blocking.
30 2. Framing for non-load-bearing partitions.
31 3. Plywood backing panels.

32 **2.4 LUMBER**

- 33 A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other
34 construction, including the following:
35 1. Blocking.
36 2. Nailers.
37 3. Rooftop equipment bases and support curbs.
38 4. Cants.
39 5. Furring.
40 6. Grounds.
41 B. Dimension Lumber Items: Wood roof curbs and nailers shall be kiln-dried (Southern Pine, Douglas Fir)
42 structural grade #2 or better.
43 C. Concealed Boards: 15 percent maximum moisture content and any of the following species and grades:
44 1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
45 2. Eastern softwoods; No. 2 Common grade; NeLMA.
46 3. Northern species; No. 2 Common grade; NLGA.
47 4. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

48 **2.5 PLYWOOD BACKING PANELS**

- 49 A. Equipment Backing Panels: Plywood, DOC PS 1, fire-retardant treated, in thickness indicated or, if not
50 indicated, not less than **3/4-inch** nominal thickness.

51 **2.6 FASTENERS**

- 52 A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this
53 article for material and manufacture.

- 1 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or
- 2 in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with
- 3 ASTM A 153/A 153M.
- 4 B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having
- 5 jurisdiction, based on ICC-ES AC70.

6 **2.7 MISCELLANEOUS MATERIALS**

- 7 A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or
- 8 rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded
- 9 polyolefin to produce an overall thickness of not less than 0.025 inch.
- 10 B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with
- 11 ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
- 12 1. Adhesives shall have a VOC content of **70** < g/L or less.

13 **PART 3 - EXECUTION**

14 **3.1 INSTALLATION, GENERAL**

- 15 A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough
- 16 carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports
- 17 to comply with requirements for attaching other construction.
- 18 B. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- 19 C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible
- 20 flashing separator between wood and metal decking.
- 21 D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with
- 22 the following:
- 23 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
- 24 2. ICC-ES evaluation report for fastener.

25 **3.2 PROTECTION**

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

31 **END OF SECTION**

SECTION 06 16 00
SHEATHING

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17 [3.1 INSTALLATION, GENERAL](#)

18 **PART 1 - GENERAL**

19 **1.1 RELATED DOCUMENTS**

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

22 **1.2 SUMMARY**

- 23 A. Section Includes:
24 1. Wall sheathing.
25 2. Sheathing joint and penetration treatment (**SHTG-2**).
26 B. Related Sections:
27 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

28 **1.3 ACTION SUBMITTALS**

- 29 A. Product Data: For each type of process and factory-fabricated product.
30 B. Sustainable Design Submittals:
31 1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
32 2. Chain-of-Custody Qualification Data: For manufacturer and vendor.
33 3. Product Data: For composite wood products, indicating that product contains no urea
34 formaldehyde.
35 4. Laboratory Test Reports: For composite wood products, indicating compliance with requirements
36 for low-emitting materials.
37 5. Product Data: For installation adhesives, indicating VOC content.
38 6. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for
39 low-emitting materials.

40 **1.4 INFORMATIONAL SUBMITTALS**

- 41 A. Evaluation Reports: For the following, from ICC-ES:
42 1. Wood-preserved-treated plywood.
43 2. Foam-plastic sheathing.

44 **1.5 QUALITY ASSURANCE**

- 45 A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-
46 accredited certification body.
47 B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification
48 body.
49 C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated
50 material, an inspection agency acceptable to authorities having jurisdiction that periodically performs
51 inspections to verify that the material bearing the classification marking is representative of the material
52 tested.

1 **1.6 DELIVERY, STORAGE, AND HANDLING**

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

5 **PART 2 - PRODUCTS**

6 **2.1 WOOD PANEL PRODUCTS**

- 7 A. Certified Wood: The following wood products shall be certified as "FSC Pure" or "FSC Mixed Credit"
8 according to FSC STD-01-00 and FSC STD-40-004.
9 1. Plywood.

10 **2.2 PRESERVATIVE-TREATED PLYWOOD**

- 11 A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.
12 B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities
13 having jurisdiction.

14 **2.3 WALL SHEATHING (SHTG-2)**

- 15 A. Plywood Sheathing: DOC PS 1 Exterior, Structural I sheathing.

16 **2.4 FASTENERS**

- 17 A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article
18 for material and manufacture.
19 1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with
20 ASTM A 153/A 153M.

21 **2.5 MISCELLANEOUS MATERIALS**

- 22 A. Exterior Metal Z Furring:
23 1. Material: Grade 33ksi minimum yield strength, 16ga DW Design.
24 2. Coating: G60EQ
25 3. Dimensions: 3/4 inch leg x 1-1/4 inch leg x depth as indicated to accommodate insulation.
26 4. AISI North American Specification (NASPEC) 2001 Supplement.
27 5. Furring channel is produced to meet or exceed ASTM C645.
28 6. Galvanized sheet steel meets or exceeds requirements of ASTM A924 & A1003.

29 **PART 3 - EXECUTION**

30 **3.1 INSTALLATION, GENERAL**

- 31 A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with
32 minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span
33 between fewer than three support members.
34 B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction
35 unless otherwise indicated.
36 C. Securely attach to substrate by fastening as indicated, complying with the following:
37 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
38 2. ICC-ES evaluation report for fastener.
39 D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are
40 installed in sequence and manner that prevent exterior moisture from passing through completed
41 assembly.
42 E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural
43 support elements.

44 **END OF SECTION**

SECTION 06 16 43

EXTERIOR GYPSUM SHEATHING

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [ACTION SUBMITTALS](#)
- 1.4 [INFORMATIONAL SUBMITTALS](#)
- 1.5 [DELIVERY, STORAGE, AND HANDLING](#)
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PART 2 – PRODUCTS

- 2.1 [PERFORMANCE REQUIREMENTS](#)
- 2.2 [WALL SHEATHING \(SHTG-1\)](#)
- 2.3 [FASTENERS](#)

PART 3 – EXECUTION

- 3.1 [INSTALLATION, GENERAL](#)
- 3.2 [GYPSUM SHEATHING INSTALLATION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Gypsum wall sheathing (**SHTG-1**).
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 06 10 00 "Rough Carpentry" for plywood backing panels.
 - 3. Section 06 16 00 "Sheathing" for plywood structural sheathing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2. Environmental Product Declaration: For each product.
 - 3. Health Product Declaration: For each product.
 - 4. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: From air-barrier and water-resistant glass-mat gypsum sheathing manufacturer, certifying compatibility of sheathing accessory materials with Project materials that connect to or that come in contact with the sheathing.
- B. Product Test Reports: For each air-barrier and water-resistant glass-mat gypsum sheathing assembly, indicating compliance with specified requirements, for tests performed by a qualified testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 WARRANTY

- A. Manufacturer warrants product for the for fitness of application of the following:
 - 1. Sheathing panels against delamination and deterioration for 12 months of exposure to normal weather conditions.
 - 2. Five years against manufacturing defects.

- 1 3. Sheathing panels shall be mold-resistant, and have scored a 10, the highest level of performance for
2 mold resistance under ASTM D3273 test method.

3 **PART 2 - PRODUCTS**

4 **2.1 PERFORMANCE REQUIREMENTS**

- 5 A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify
6 products with appropriate markings of applicable testing agency.
7 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or
8 from the listings of another qualified testing agency.

9 **2.2 WALL SHEATHING (SHTG-1)**

- 10 A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less
11 than 50 percent.
12 B. Regional Materials: Products shall be manufactured within 500 miles of Project site from materials that have
13 been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
14 C. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
15 1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia-Pacific Gypsum
16 LLC.; Dens-Glass Gold or comparable product by one of the following:
17 a. CertainTeed Corporation; GlasRoc.
18 b. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
19 c. Temple-Inland Building Products by Georgia-Pacific; Greenglass Exterior Sheathing.
20 d. USG Corporation; Securock.
21 2. Type and Thickness: As indicated or scheduled.
22 3. Size: As indicated or scheduled for vertical installation.
23 D. Performance (Minimum Values):
24 1. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square
25 foot, dry.
26 2. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
27 3. Humidified Deflection (ASTM C1177): Not more than 2/8 inch.
28 4. Permeance (ASTM E96): Not less than 23 perms.
29 5. R-Value (ASTM C518): 0.56.
30 6. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not
31 support microbial growth.
32 E. Fiberglass-Mat Faced Gypsum Sheathing, Type X for Fire Rated Designs:
33 1. Basis of Design: DensGlass Fireguard Sheathing. Comparable product by listed manufacturers.

34 **2.3 FASTENERS**

- 35 A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article
36 for material and manufacture.
37 1. For wall sheathing, provide fasteners of Type 304 stainless steel.
38 B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length
39 recommended by sheathing manufacturer for thickness of sheathing to be attached.
40 1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
41 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

42 **PART 3 - EXECUTION**

43 **3.1 INSTALLATION, GENERAL**

- 44 A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with
45 minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between
46 fewer than three support members.
47 B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction
48 unless otherwise indicated.
49 C. Securely attach to substrate by fastening as indicated, complying with the following:
50 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
51 2. ICC-ES evaluation report for fastener.
52 D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are
53 installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

- 1 E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support
2 elements.
3 F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not
4 exposed to precipitation or left exposed at end of the workday when rain is forecast.

5 **3.2 GYPSUM SHEATHING INSTALLATION**

- 6 A. Comply with GA-253 and with manufacturer's written instructions.
7 1. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
8 2. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain
9 moisture, to prevent wicking.
10 B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
11 C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue
12 with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over
13 centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at
14 perimeter and within field of panel to each stud.
15 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and
16 ends of panels.
17 D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent
18 panels. Attach at perimeter and within field of panel to each stud.
19 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and
20 ends of panels.
21 E. Seal sheathing joints according to sheathing manufacturer's written instructions.
22 1. Paper Faced Sheathing: Apply elastomeric sealant to joints and fasteners and trowel flat. Apply
23 sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other
24 penetrations and openings.
25 2. Glass-mat Sheathing: Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and
26 apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners
27 with a trowel so fasteners are completely covered. Seal other penetrations and openings.

28 **END OF SECTION**

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SECTION 06 40 23

INTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

- 1.1 RELATED DOCUMENTS
- 1.2 SUMMARY
- 1.3 PREINSTALLATION MEETINGS
- 1.4 DEFINITIONS
- 1.5 ACTION SUBMITTALS
- 1.6 QUALITY ASSURANCE
- 1.7 DELIVERY, STORAGE, AND HANDLING
- 1.8 FIELD CONDITIONS
- 1.9 COORDINATION

PART 2 – PRODUCTS

- 2.1 INTERIOR ARCHITECTURAL WOODWORK, GENERAL
- 2.2 MATERIALS, GENERAL
- 2.3 PLYWOOD (WD-2)
- 2.4 FIRE-RETARDANT-TREATED MATERIALS
- 2.5 MISCELLANEOUS MATERIALS
- 2.6 SHOP FINISHING

PART 3 – EXECUTION

- 3.1 PREPARATION
- 3.2 INSTALLATION, GENERAL
- 3.3 STANDING AND RUNNING TRIM INSTALLATION
- 3.4 PANELING INSTALLATION
- 3.5 SHELVING INSTALLATION
- 3.6 ADJUSTING AND CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior trim.
 - 2. Related woodwork accessories.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 0610 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
 - 3. Section 06 42 16 "Flush Wood Paneling" for wood veneered wall panels.
 - 4. Section 10 11 00 "Visual Display Units" for cork surfaced wall panels.

1.3 PREINSTALLATION MEETINGS

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

1.4 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
- B. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

- 1 1. Show details full size.
- 2 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and
- 3 reinforcement specified in other Sections.
- 4 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and
- 5 other items installed in architectural woodwork.
- 6 4. Coordination of adjoining construction, trim and moldings.
- 7 D. Sustainable Design Submittals:
- 8 1. Product Certificates: For regional materials, indicating location of material manufacturer and point
- 9 of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for
- 10 each regional material.
- 11 2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
- 12 3. Chain-of-Custody Qualification Data: For manufacturer and vendor.
- 13 4. Product Data: For installation adhesives, indicating VOC content.
- 14 5. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for
- 15 low-emitting materials.
- 16 E. Samples: For each type of trim, board, stool and panel.
- 17 F. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

18 1.6 QUALITY ASSURANCE

- 19 A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-
- 20 accredited certification body.
- 21 B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification
- 22 body.
- 23 C. Installer Qualifications: Certified participant in AWI's Quality Certification Program.
- 24 D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality
- 25 Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation,
- 26 and other requirements.
- 27 E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide
- 28 materials and products with specified fire-test-response characteristics as determined by testing identical
- 29 products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to
- 30 authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting
- 31 agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on
- 32 surfaces of materials that will be concealed from view after installation.
- 33 F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01
- 34 Section "Project Management and Coordination."

35 1.7 DELIVERY, STORAGE, AND HANDLING

- 36 A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and
- 37 deterioration.
- 38 B. Do not deliver woodwork until painting and similar operations that could damage woodwork have been
- 39 completed in installation areas. If woodwork must be stored in other than installation areas, store only in
- 40 areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

41 1.8 FIELD CONDITIONS

- 42 A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is
- 43 complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and
- 44 relative humidity between 25 and 55 percent during the remainder of the construction period.
- 45 B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other
- 46 construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
- 47 Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- 48 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field
- 49 measurements before being enclosed, and indicate measurements on Shop Drawings.
- 50 2. Established Dimensions: Where field measurements cannot be made without delaying the Work,
- 51 establish dimensions and proceed with fabricating woodwork without field measurements. Provide
- 52 allowance for trimming at site, and coordinate construction to ensure that actual dimensions
- 53 correspond to established dimensions.

54 1.9 COORDINATION

- 55 A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of
- 56 Work specified in other Sections to ensure that interior architectural woodwork can be supported and
- 57 installed as indicated.

1 **PART 2 - PRODUCTS**

2 **2.1 INTERIOR ARCHITECTURAL WOODWORK, GENERAL**

- 3 A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for
4 grades of interior architectural woodwork indicated for construction, finishes, installation, and other
5 requirements.
6 1. The Contract Documents contain requirements that are more stringent than the referenced quality
7 standard. Comply with requirements of Contract Documents in addition to those of the referenced
8 quality standard.

9 **2.2 MATERIALS, GENERAL**

- 10 A. Certified Wood: The following wood products shall be certified as "FSC Pure" or "FSC Mixed Credit"
11 according to FSC STD-01-00 and FSC STD-40-004.
12 1. Interior trim.
13 B. Wood Species and Cut for Transparent Finish: Provide AWI Premium grade wood of similar grain, texture,
14 and density to produce uniformity of color and finish throughout the complete installation of furniture,
15 architectural woodwork, and millwork as follows:

16 **2.3 PLYWOOD (WD-2):**

- 17 A. Basis of Design: WI Sourced Hampton Maple, EUROPLY Plus as manufactured by Columbia Forest
18 Products.
19 1. Thickness: 18 mm.
20 2. Finish: BIOSHEILD 33 Aqua Resin Stain Finish, 00 CLEAR.
21 3. Panel Species: WI Sourced Hampton Maple.
22 4. Grade: A, per ANSI/HPVA HP-1.
23 5. Core: Multi-Layered Core Hardwood Plywood: Provide specialty all hardwood European style
24 (Europly PLUS™) high-plycount birch veneer core blank with a phenolic-bonded platform as
25 manufactured by Columbia Forest Products.
26 6. Back: Maple.
27 7. FSC Certified: FSC100% - Pure.
28 8. Recycled Content: 20%.
29 B. Surface burning characteristics shall not exceed values indicated below, tested per ASTM E 84.
30 1. Flame Spread: 200.
31 2. Smoke Developed: 450.

32 **2.4 MISCELLANEOUS MATERIALS**

- 33 A. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general
34 carpentry use.
35 1. Adhesives shall have a VOC content of 30 g/L or less.
36 B. Paneling Adhesive: Comply with paneling manufacturer's written recommendations for adhesives.
37 1. Adhesives shall have a VOC content of 50 g/L or less.

38 **2.5 SHOP FINISHING**

- 39 A. General: Finish raw edges and surfaces of architectural wood work not factory finished at fabrication shop
40 as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
41 B. Finish Materials: Use finish materials that meet the testing and product requirements of the California
42 Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from
43 Various Sources Using Small-Scale Environmental Chambers."
44 C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk
45 fasteners, sealing concealed surfaces, and similar preparations for finishing architectural wood cabinets,
46 as applicable to each unit of work.
47 D. Transparent Finish:
48 1. Same system and finish as factory applied finish.

49 **PART 3 - EXECUTION**

50 **3.1 PREPARATION**

- 51 A. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation
52 areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

- 1 **3.2 INSTALLATION, GENERAL**
2 A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims
3 where necessary for alignment.
4 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended
5 by manufacturer.
6 2. Countersink fasteners, fill surface flush, and sand unless otherwise indicated.
7 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish
8 carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for
9 reveal installation.
10 4. Install stairs with no more than 3/16-inch variation between adjacent treads and risers and with no
11 more than 3/8-inch variation between largest and smallest treads and risers within each flight.
- 12 **3.3 STANDING AND RUNNING TRIM INSTALLATION**
13 A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber
14 available. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints
15 with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.
- 16 **3.4 ADJUSTING AND CLEANING**
17 A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and
18 visual defects. Where not possible to repair, replace interior architectural woodwork. Adjust joinery for
19 uniform appearance.
20 B. Clean interior architectural woodwork on exposed and semiexposed surfaces. Touch-up finishes to restore
21 damaged or soiled areas.

22 **END OF SECTION**

SECTION 06 41 13

WOOD-VENEER-FACED ARCHITECTURAL CABINETS

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [PREINSTALLATION MEETINGS](#)
- 1.4 [ACTION SUBMITTALS](#)
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PART 2 – PRODUCTS

- 2.1 [ARCHITECTURAL WOOD CABINETS, GENERAL](#)
- 2.2 [WOOD CABINETS](#)
- 2.3 [ENGINEERED COLORED WOOD \(WD-1A\)](#)
- 2.4 [WOOD MATERIALS](#)
- 2.5 [LINOLEUM MATERIALS \(LINO-1\)](#)
- 2.6 [CABINET HARDWARE AND ACCESSORIES](#)
- 2.7 [FABRICATION](#)
- 2.8 [SHOP FINISHING](#)

PART 3 – EXECUTION

- 3.1 [PREPARATION](#)
- 3.2 [INSTALLATION](#)
- 3.3 [ADJUSTING AND CLEANING](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Architectural wood cabinets.
 - 2. Shop finishing of architectural wood cabinets.
 - 3. Countertops and countertops attached to railing system referenced as MW-11 on the Drawings.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets and concealed within other construction before cabinet installation.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including, panel products, cabinet hardware and accessories, and finishing materials and processes.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. LEED Submittals:
 - 1. Product Certificates: For products and materials required to comply with requirements for regionally manufactured materials. Include statement indicating cost for each regionally manufactured material.
 - a. Include statement indicating location of manufacturer and distance to Project for each regionally manufactured material.

- 1 2. Certificates: Chain-of-custody certificates indicating that products specified to be made from
2 certified wood comply with forest certification and chain-of-custody requirements. Include statement
3 indicating cost for each certified wood product.
- 4 3. Laboratory Test Reports: For composite wood products, documentation indicating that products
5 comply with the testing and product requirements of the California Department of Health Services'
6 "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using
7 Small-Scale Environmental Chambers."
- 8 C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details,
9 attachment devices, and other components.
 - 10 1. Show details full size.
 - 11 2. Show locations and sizes of cutouts and holes for electrical switches and outlets installed in
12 architectural wood cabinets.
 - 13 3. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers
14 indicating the flitch and sequence within the flitch for each leaf.
- 15 D. Samples for Verification:
 - 16 1. Lumber for transparent finish, not less than 5 incheswide by 12 incheslong, for each species and
17 cut, finished on one side and one edge.
 - 18 2. Exposed cabinet hardware and accessories, one unit for each type and finish.

19 **1.5 INFORMATIONAL SUBMITTALS**

- 20 A. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

21 **1.6 QUALITY ASSURANCE**

- 22 A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to
23 those required for this Project and whose products have a record of successful in-service performance.
- 24 B. Installer Qualifications: Fabricator of products.
- 25 C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic
26 effects and set quality standards for materials and execution.
 - 27 1. Build mockups of typical architectural wood cabinets as shown on Drawings.
 - 28 2. Subject to compliance with requirements, approved mockups may become part of the completed
29 Work if undisturbed at time of Substantial Completion.

30 **1.7 DELIVERY, STORAGE, AND HANDLING**

- 31 A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been
32 completed in installation areas. If cabinets must be stored in other than installation areas, store only in
33 areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

34 **1.8 FIELD CONDITIONS**

- 35 A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is
36 complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy
37 levels during the remainder of the construction period.
- 38 B. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is
39 complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and
40 relative humidity between 25 and 55 percent during the remainder of the construction period.
- 41 C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other
42 construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
43 Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 44 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field
45 measurements before being enclosed, and indicate measurements on Shop Drawings.
- 46 D. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for
47 areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to
48 ensure that actual dimensions correspond to established dimensions.

49 **1.9 COORDINATION**

- 50 A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of
51 Work specified in other Sections to ensure that wood-veneer-faced architectural cabinets can be
52 supported and installed as indicated.
- 53 B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Section 08 71 11
54 "Door Hardware (Descriptive Specification)" to fabricator of architectural woodwork; coordinate Shop
55 Drawings and fabrication with hardware requirements.

1 **PART 2 - PRODUCTS**

2 **2.1 ARCHITECTURAL WOOD CABINETS, GENERAL**

- 3 A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for
4 grades of architectural wood cabinets indicated for construction, finishes, installation, and other
5 requirements.
6 1. The Contract Documents contain selections chosen from options in the quality standard and
7 additional requirements beyond those of the quality standard. Comply with those selections and
8 requirements in addition to the quality standard.

9 **2.2 WOOD CABINETS**

- 10 A. Grade: Custom.
11 B. Regional Materials: Wood cabinets for transparent finish shall be manufactured within 500 miles of Project
12 site.
13 C. Certified Wood: Wood cabinets for transparent finish shall be produced from wood certified as "FSC Pure"
14 according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and FSC STD-40-
15 004, "FSC Standard for Chain of Custody Certification."
16 D. Type of Construction: Refer to Drawings.
17 E. Cabinet and Door and Drawer Front Interface Style: Flush overlay.
18 F. Wood for Exposed Surfaces: As indicated.
19 G. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located
20 directly under tops.
21 H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from
22 interior of body.
23 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners
24 or glued dovetail joints.

25 **2.3 ENGINEERED COLORED WOOD (WD-1A)**

- 26 A. Basis of Design: Color-Through Fiberboard – Forescolor as manufactured by Interlam.
27 B. Physical Characterizes:
28 1. Construction: Through-color wood fiber panel. Individual fibers are impregnated with organic dye
29 and chemically bonded by resin specially developed to give the panel its special properties.
30 C. Performance:
31 1. Fire Resistive Rating as Manufactured: Class C (III).
32 2. Formaldehyde: Non toxic according to US requirements with emissions are below 0.1ppm.
33 3. CARB (N-14-180): Complies.
34 4. FSC: Complies.
35 5. Recyclable Content: 50-60% recycled raw materials.
36 D. Finish:
37 1. Manufactured Colors: Refer to Material ID List and Drawings.
38 E. Shop Finishing:
39 1. Product: Rubio Monocoat Oil Plus 2C Oil System as manufactured by Muylle Facon (Belgium).
40 2. System: Oil (Clear – 2 part mixture) applied in one coat per manufacturer's requirements.
41 3. VOC Content: 0% VOC.

42 **2.4 WOOD MATERIALS**

- 43 A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each
44 type of woodwork and quality grade specified unless otherwise indicated.
45 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches wide.
46 B. Plywood (**WD-2**):
47 1. Basis of Design: WI Sourced Hampton Maple, EUROPLY Plus as manufactured by Columbia
48 Forrest Products.
49 2. Thickness: 18 mm.
50 3. Finish: Clear sealer. Factory Finish: Provide clear UV-cured acrylic coating on both sides. Gloss
51 level:
52 4. Panel Species: WI Sourced Hampton Maple.
53 5. Grade: A, per ANSI/HPVA HP-1.
54 6. Core: Multi-Layered Core Hardwood Plywood: Provide specialty all hardwood European style
55 (Europly PLUS™) high-plycount birch veneer core blank with a phenolic-bonded platform as
56 manufactured by Columbia Forest Products.
57 7. Back: Maple.

- 1 8. FSC Certified: FSC100% - Pure.
- 2 9. Recycled Content: 20%.
- 3 10. Surface burning characteristics shall not exceed values indicated below, tested per ASTM E 84.
- 4 a. Flame Spread: 200.
- 5 b. Smoke Developed: 450.
- 6 11. Wood Moisture Content: 5 to 10 percent.
- 7 C. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced
- 8 quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
- 9 1. Composite Wood and Agrifiber Products: Products shall comply with the testing and product
- 10 requirements of the California Department of Health Services' "Standard Practice for the Testing of
- 11 Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- 12 2. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea
- 13 formaldehyde.
- 14 3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
- 15 4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1. Urea formaldehyde free.

2.5 LINOLEUM MATERIALS (LINO-1)

- 16 A. Product: Sheet goods made of linseed oil, wood flour, natural pigments, tree rosins and limestone.
- 17 B. Linoleum Sheet:
- 18 1. Basis of Design: Forbo Marmoleum Linoleum.
- 19 2. Thickness or Height: 0.08 inch.
- 20 3. Thickness: 2mm.
- 21 4. Length: 1182 inches.
- 22 5. Width: 72 inches.
- 23 6. Certifications: FloorScore.
- 24 7. Recycled Content: 80%.
- 25 8. Construction: Solid.
- 26 9. Installation: Glue-Down.
- 27

2.6 CABINET HARDWARE AND ACCESSORIES

- 28 A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except
- 29 for items specified in Section 08 71 11 "Door Hardware."
- 30 B. Exposed Cabinet Hardware (**MA-#**): Refer to Materials List.
- 31 C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, degrees of opening as selected
- 32 and, self-closing.
- 33 D. Catches: As scheduled or selected by Architect.
- 34 1. Magnetic catches, BHMA A156.9, B03141
- 35 2. Push-in magnetic catches, BHMA A156.9, B03131
- 36 3. Roller catches, BHMA A156.9, B03071
- 37 4. Ball friction catches, BHMA A156.9, B03013.
- 38 E. Drawer Slides: BHMA A156.9.
- 39 1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer; full-extension
- 40 type; epoxy-coated steel with polymer rollers.
- 41 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-
- 42 bearing slides.
- 43 3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 2.
- 44 4. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches
- 45 wide, provide Grade 1.
- 46 5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-100.
- 47 6. For computer keyboard shelves, provide Grade 1.
- 48 7. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-100.
- 49 F. Door and Drawer Silencers: BHMA A156.16, L03011.
- 50 G. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for
- 51 BHMA finish number indicated.
- 52 1. Refer to Material ID list – MA-#.
- 53 H. For concealed hardware, provide manufacturer's standard finish that complies with product class
- 54 requirements in BHMA A156.9.
- 55
- 56

- 1 **2.7 FABRICATION**
- 2 A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- 3 B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the
- 4 following:
- 5 1. Corners of Cabinets: 1/16 inch unless otherwise indicated.
- 6 C. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible
- 7 before shipment to Project site. Disassemble components only as necessary for shipment and installation.
- 8 Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- 9 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be
- 10 complete.
- 11 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install
- 12 dowels, screws, bolted connectors, and other fastening devices that can be removed after trial
- 13 fitting. Verify that various parts fit as intended and check measurements of assemblies against field
- 14 measurements before disassembling for shipment.
- 15 D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and
- 16 similar items. Locate openings accurately and use templates or roughing-in diagrams to produce
- 17 accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- 18 **2.8 SHOP FINISHING**
- 19 A. General: Finish architectural wood cabinets at fabrication shop as specified in this Section. Defer only final
- 20 touchup, cleaning, and polishing until after installation.
- 21 B. Finish Materials: Use finish materials that meet the testing and product requirements of the California
- 22 Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from
- 23 Various Sources Using Small-Scale Environmental Chambers."
- 24 C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk
- 25 fasteners, sealing concealed surfaces, and similar preparations for finishing architectural wood cabinets,
- 26 as applicable to each unit of work.
- 27 1. Back priming: Apply one coat of sealer or primer, compatible with finish coats, to concealed
- 28 surfaces of cabinets.
- 29 D. Transparent Finish:
- 30 1. Grade: Same as item to be finished.
- 31 2. Finish: System - 4, water-based latex acrylic. Two coats typical unless noted otherwise.
- 32 3. Staining: Match approved sample for color.
- 33 4. Sheen: Flat, 15-30 gloss units measured on 60-degree gloss meter per ASTM D 523.

34 **PART 3 - EXECUTION**

35 **3.1 PREPARATION**

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

39 **3.2 INSTALLATION**

- 40 A. Grade: Install cabinets to comply with same grade as item to be installed.
- 41 B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the
- 42 shop.
- 43 C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and
- 44 plumb to a tolerance of 1/8 inch in 96 inches.
- 45 D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- 46 E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk,
- 47 concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening,
- 48 countersunk and filled flush with woodwork.
- 49 1. For shop finished items use filler matching finish of items being installed.
- 50

- 1 F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned.
2 Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
3 Complete installation of hardware and accessory items as indicated.
4 1. Install cabinets with no more than 1/8 inch in 96-inchsag, bow, or other variation from a straight
5 line.
6 2. Maintain veneer sequence matching of cabinets with transparent finish.
7 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c.
8 with No. 10 wafer-head screws sized for not less than 1-1/2-inchpenetration into wood framing,
9 blocking, or hanging strips.
10 G. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching
11 filler where exposed.
12 1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only
13 sealer/prime coats are applied in shop.

14 **3.3 ADJUSTING AND CLEANING**

- 15 A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where
16 not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
17 B. Clean, lubricate, and adjust hardware.
18 C. Clean cabinets on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore
19 damaged or soiled areas.

20 **END OF SECTION**

SECTION 06 41 20

MODULAR CASEWORK FABRICATIONS

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [PREINSTALLATION MEETINGS](#)
- 1.4 [ACTION SUBMITTALS](#)
- 1.5 [INFORMATIONAL SUBMITTALS](#)
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PART 2 – PRODUCTS

- 2.1 [ARCHITECTURAL CASEWORK FABRICATIONS, GENERAL](#)
- 2.2 [CASEWORK FABRICATIONS](#)
- 2.3 [ENGINEERED COLORED WOOD \(WD-1A\)](#)
- 2.4 [MATERIALS](#)
- 2.5 [CABINET HARDWARE AND ACCESSORIES](#)
- 2.6 [FABRICATION](#)
- 2.7 [SHOP FINISHING](#)

PART 3 – EXECUTION

- 3.1 [PREPARATION](#)
- 3.2 [INSTALLATION](#)
- 3.3 [ADJUSTING AND CLEANING](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Mobile Retail Display fabrication.
 - 2. Mobile Display Pedestals.
 - 3. Waste Bin.
 - 4. Modular stacking space dividers and storage casework fabrications.
 - 5. Shop finishing of modular casework fabrications.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 05 50 00 "Metal Fabrications" for metal frame to support and reinforce fabrication of Modular Casework.
 - 3. Section 06 41 13 "Wood-Veneer-Faced Architectural Cabinets" for fixed base and wall wood veneered cabinets.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including, panel products, cabinet hardware and accessories, and finishing materials and processes.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. LEED Submittals:
 - 1. Product Certificates: For products and materials required to comply with requirements for regionally manufactured materials. Include statement indicating cost for each regionally manufactured material.

- 1 a. Include statement indicating location of manufacturer and distance to Project for each
- 2 regionally manufactured material.
- 3 2. Certificates: Chain-of-custody certificates indicating that products specified to be made from
- 4 certified wood comply with forest certification and chain-of-custody requirements. Include statement
- 5 indicating cost for each certified wood product.
- 6 3. Laboratory Test Reports: For composite wood products, documentation indicating that products
- 7 comply with the testing and product requirements of the California Department of Health Services'
- 8 "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using
- 9 Small-Scale Environmental Chambers."
- 10 C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details,
- 11 attachment devices, and other components.
- 12 1. Show details full size.
- 13 2. Show locations and sizes of cutouts and holes for electrical switches and outlets installed in
- 14 architectural wood cabinets.
- 15 3. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers
- 16 indicating the flitch and sequence within the flitch for each leaf.
- 17 D. Samples for Verification:
- 18 1. Lumber for transparent finish, not less than 5 inches wide by 12 inches long, for each species and
- 19 cut, finished on one side and one edge.
- 20 2. Exposed cabinet hardware and accessories, one unit for each type and finish.

21 1.5 INFORMATIONAL SUBMITTALS

- 22 A. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

23 1.6 QUALITY ASSURANCE

- 24 A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to
- 25 those required for this Project and whose products have a record of successful in-service performance.
- 26 B. Installer Qualifications: Fabricator of products.
- 27 C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic
- 28 effects and set quality standards for materials and execution.
- 29 1. Build mockups of typical architectural wood cabinets as shown on Drawings.
- 30 2. Subject to compliance with requirements, approved mockups may become part of the completed
- 31 Work if undisturbed at time of Substantial Completion.

32 1.7 DELIVERY, STORAGE, AND HANDLING

- 33 A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been
- 34 completed in installation areas. If cabinets must be stored in other than installation areas, store only in
- 35 areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

36 1.8 FIELD CONDITIONS

- 37 A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is
- 38 complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and
- 39 relative humidity between 25 and 55 percent during the remainder of the construction period.
- 40 B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other
- 41 construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
- 42 Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- 43 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field
- 44 measurements before being enclosed, and indicate measurements on Shop Drawings.
- 45 C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for
- 46 areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to
- 47 ensure that actual dimensions correspond to established dimensions.

48 1.9 COORDINATION

- 49 A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of
- 50 Work specified in other Sections to ensure that wood-veneer-faced architectural cabinets can be
- 51 supported and installed as indicated.
- 52 B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Section 08 71 11
- 53 "Door Hardware (Descriptive Specification)" to fabricator of architectural woodwork; coordinate Shop
- 54 Drawings and fabrication with hardware requirements.

1 **PART 2 - PRODUCTS**

2 **2.1 ARCHITECTURAL CASEWORK FABRICATIONS, GENERAL**

- 3 A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for
4 grades of architectural casework fabrications indicated for construction, finishes, installation, and other
5 requirements.
6 1. The Contract Documents contain selections chosen from options in the quality standard and
7 additional requirements beyond those of the quality standard. Comply with those selections and
8 requirements in addition to the quality standard.

9 **2.2 CASEWORK FABRICATIONS**

- 10 A. Regional Materials: Casework fabrications for transparent finish shall be manufactured within 500 miles of
11 Project site.
12 B. Certified Wood: Wood cabinets for transparent finish shall be produced from wood certified as "FSC Pure"
13 according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and FSC STD-40-
14 004, "FSC Standard for Chain of Custody Certification."
15 C. Type of Construction: Refer to Drawings.

16 **2.3 ENGINEERED COLORED WOOD (WD-1A)**

- 17 A. Basis of Design: Color-Through Fiberboard – Forescolor as manufactured by Interlam.
18 B. Physical Characterizes:
19 1. Construction: Through-color wood fiber panel. Individual fibers are impregnated with organic dye
20 and chemically bonded by resin specially developed to give the panel its special properties.
21 C. Performance:
22 1. Fire Resistive Rating as Manufactured: Class C (III).
23 2. Formaldehyde: Non toxic according to US requirements with emissions are below 0.1ppm.
24 3. CARB (N-14-180): Complies.
25 4. FSC: Complies.
26 5. Recyclable Content: 50-60% recycled raw materials.
27 D. Finish:
28 1. Manufactured Colors: Black.
29 E. Shop Finishing:
30 1. BIOSHEILD 33 Aqua Resin Stain Finish, 00 CLEAR
31 F. Fabrication:
32 1. Toe Kick / Wall Base: 4 inches H X 18MM thick, finish to match.

33 **2.4 MATERIALS**

- 34 A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each
35 type of woodwork and quality grade specified unless otherwise indicated.
36 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches wide.
37 2. Wood Moisture Content: 5 to 10 percent.
38 B. Plywood (**WD-2**):
39 1. Basis of Design: WI Sourced Hampton Maple, EUROPLYPlus as manufactured by Columbia
40 Forrest Products
41 2. Thickness: 18 mm.
42 3. Finish: BIOSHEILD 33 Aqua Resin Stain Finish, 00 CLEAR.
43 4. Note: FSC Certified;

44 **2.5 CABINET HARDWARE AND ACCESSORIES**

- 45 A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except
46 for items specified in Section 08 71 00 "Door Hardware."
47 B. Exposed Cabinet Hardware (**MA-#**):
48 1. Waste Basket with Dolly (**MA-1A**):
49 a. Basket: Rubbermaid Vented Slim Jim 23 GA - #FG354060BLA, Black
50 b. Dolly: Rubbermaid Slim Jim Resin Trainable - # 1980602
51 2. Waste Basket with Dolly (**MA-1B**):
52 a. Basket: Rubbermaid Vented Slim Jim 23 GA - #FG354060BLA, Black.
53 3. Waste Bin: Trash receptacle/basket fitted with dolly (MA-1A) and without dolly (MA-1B).
54 a. All plastic.
55 b. Built-in handles.
56 c. Nestable when empty.

1 d. USDA compliant. NSF certified.

2 **2.6 FABRICATION**

- 3 A. Fabricate woodwork to dimensions, profiles, and details indicated.
4 B. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible
5 before shipment to Project site. Disassemble components only as necessary for shipment and installation.
6 Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
7 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be
8 complete.
9 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install
10 dowels, screws, bolted connectors, and other fastening devices that can be removed after trial
11 fitting. Verify that various parts fit as intended and check measurements of assemblies against field
12 measurements before disassembling for shipment.
13 C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and
14 similar items. Locate openings accurately and use templates or roughing-in diagrams to produce
15 accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

16 **2.7 SHOP FINISHING**

- 17 A. General: Finish architectural wood cabinets at fabrication shop as specified in this Section. Defer only final
18 touchup, cleaning, and polishing until after installation.
19 B. Finish Materials: Use finish materials that meet the testing and product requirements of the California
20 Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from
21 Various Sources Using Small-Scale Environmental Chambers."
22 C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk
23 fasteners, sealing concealed surfaces, and similar preparations for finishing architectural wood cabinets,
24 as applicable to each unit of work.
25 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed
26 surfaces of cabinets.
27 D. Transparent Finish:
28 1. Grade: Same as item to be finished.
29 2. Finish: System - 4, water-based latex acrylic.
30 3. Staining: Match approved sample for color.
31 4. Sheen: Flat, 15-30 gloss units measured on 60-degree gloss meter per ASTM D 523.

32 **PART 3 - EXECUTION**

33 **3.1 PREPARATION**

- 34 A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.
35 B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required,
36 including removal of packing and back priming.

37 **3.2 INSTALLATION**

- 38 A. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
39 Complete installation of hardware and accessory items as indicated.

40 **3.3 ADJUSTING AND CLEANING**

- 41 A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where
42 not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
43 B. Clean, lubricate, and adjust hardware.
44 C. Clean cabinets on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore
45 damaged or soiled areas.

46 **END OF SECTION**

SECTION 06 42 16

FLUSH WOOD PANELING

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [PREINSTALLATION MEETINGS](#)
- 1.4 [ACTION SUBMITTALS](#)
- 1.5 [INFORMATIONAL SUBMITTALS](#)
- 1.6 [QUALITY ASSURANCE](#)
- 1.7 [DELIVERY, STORAGE, AND HANDLING](#)
- 1.8 [FIELD CONDITIONS](#)

PART 2 – PRODUCTS

- 2.1 [PANELING FABRICATORS](#)
- 2.2 [PANELING, GENERAL](#)
- 2.3 [FLUSH WOOD PANELING \(WOOD-VENEER WALL SURFACING\)](#)
- 2.4 [MATERIALS](#)
- 2.5 [INSTALLATION MATERIALS](#)
- 2.6 [FABRICATION](#)
- 2.7 [SHOP FINISHING](#)

PART 3 – EXECUTION

- 3.1 [PREPARATION](#)
- 3.2 [INSTALLATION](#)
- 3.3 [ADJUSTING AND CLEANING](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Flush wood paneling.
 - 2. Hanging strips for installing flush wood paneling.
 - 3. Shop finishing of flush wood paneling.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing paneling that is concealed within other construction before paneling installation.

1.3 COORDINATION

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

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
 - 3. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.

- 1 4. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
- 2 5. Product Data: For composite wood products, indicating that product contains no urea
- 3 formaldehyde.
- 4 C. Shop Drawings: For flush wood paneling.
- 5 1. Include plans, elevations, sections, and attachment details.
- 6 2. Show details full size.
- 7 3. Show locations and sizes of furring and blocking, including concealed blocking specified in other
- 8 Sections.
- 9 4. For paneling veneered in fabrication shop, show veneer leaves with dimensions, grain direction,
- 10 exposed face, and identification numbers indicating the flitch and sequence within the flitch for each
- 11 leaf.
- 12 D. Samples for Verification: For the following:
- 13 1. Veneer-Faced Panel Products for Transparent Finish: 12 by 24 inches, for each species and cut.
- 14 Include at least one face-veneer seam and finish as specified.

15 **1.6 INFORMATIONAL SUBMITTALS**

- 16 A. Qualification Data: For fabricator.
- 17 B. Product Certificates: For each type of product.
- 18 C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

19 **1.7 QUALITY ASSURANCE**

- 20 A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to
- 21 those required for this Project and whose products have a record of successful in-service performance.
- 22 B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic
- 23 effects, and to set quality standards for materials and execution.
- 24 1. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete
- 25 a mockup submittal for review.
- 26 2. Build mockups of typical paneling as shown on Drawings.
- 27 3. Subject to compliance with requirements, approved mockups may become part of the completed
- 28 Work if undisturbed at time of Substantial Completion.

29 **1.8 DELIVERY, STORAGE, AND HANDLING**

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

33 **1.9 FIELD CONDITIONS**

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

43 **PART 2 - PRODUCTS**

44 **2.1 PANELING FABRICATORS**

- 45 A. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production
- 46 of paneling.

47 **2.2 PANELING, GENERAL**

- 48 A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for
- 49 grades of flush wood paneling (wood-veneer wall surfacing) indicated for construction, finishes,
- 50 installation, and other requirements.
- 51 B. Regional Materials: Manufacture wood products within 500 miles of Project site from materials that have
- 52 been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

- 1 **2.3 FLUSH WOOD PANELING (WOOD-VENEER WALL SURFACING) WD-2**
- 2 A. Grade: Custom.
- 3 B. Certified Wood: Certify wood products as "FSC Pure" or "FSC Mixed Credit" in accordance with FSC STD-
4 01-001 and FSC STD-40-004.
- 5 C. Wood Species and Cut: Wisconsin sourced Maple.
- 6 D. Basis of Design: WI Sourced Hampton Maple, EUROPLY Plus as manufactured by Columbia Forrest
7 Products.
- 8 1. Thickness: 18 mm.
- 9 2. Finish: Clear sealer. Factory Finish: Provide clear UV-cured acrylic coating on both sides. Gloss
10 level:
- 11 3. Panel Species: WI Sourced Hampton Maple.
- 12 4. Grade: A, per ANSI/HPVA HP-1.
- 13 5. Core: Multi-Layered Core Hardwood Plywood: Provide specialty all hardwood European style
14 (Europly PLUS™) high-plycount birch veneer core blank with a phenolic-bonded platform as
15 manufactured by Columbia Forest Products.
- 16 6. Back: Maple.
- 17 7. FSC Certified: FSC100% - Pure.
- 18 8. Recycled Content: 20%.
- 19 E. Surface burning characteristics shall not exceed values indicated below, tested per ASTM E 84.
- 20 1. Flame Spread: 200.
- 21 2. Smoke Developed: 450.
- 22 F. Panel-Matching Method:
- 23 1. No matching is required between adjacent panels. Select and arrange panels for similarity of grain
24 pattern and color between adjacent panels.
- 25 G. Assemble panels by concealed fastening.
- 26 **2.4 MATERIALS**
- 27 A. Materials, General: Provide materials that comply with requirements of referenced quality standard for
28 each quality grade specified unless otherwise indicated.
- 29 B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced
30 quality standard for each quality grade specified unless otherwise indicated.
- 31 1. Recycled Content of MDF and Particleboard: Postconsumer recycled content plus one-half of
32 preconsumer recycled content not less than 25 percent.
- 33 2. Composite Wood Products: Verify products are made without added urea formaldehyde.
- 34 3. MDF: ANSI A208.2, Grade 130.
- 35 4. Particleboard: ANSI A208.1, Grade M-2.
- 36 5. Straw-Based Particleboard: ANSI A208.1, Grade M-2, except for density.
- 37 C. Adhesives: Do not use adhesives that contain urea formaldehyde.
- 38

1 **2.5 INSTALLATION MATERIALS**

- 2 A. Hanging System: Aluminum Z Clip Hanging System:
- 3 1. Material: 6063-T6 Alloy and temper in accordance with ASTM B 221.
- 4 2. Basis of Design: Eagle Mouldings.
- 5 3. Size: As recommended by manufacturer for size, weight and positioning of panels.
- 6 B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide
- 7 metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip
- 8 galvanized anchors and inserts at inside face of exterior walls.

9 **2.6 FABRICATION**

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

29 **2.7 SHOP FINISHING**

- 30 A. General: Finish paneling at fabrication shop as specified in this Section. Defer only final touchup, cleaning,
- 31 and polishing until after installation.
- 32 B. Shop Priming: Shop apply the prime coat including backpriming, if any, for transparent-finished paneling
- 33 specified to be field finished.
- 34 C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk
- 35 fasteners, sealing concealed surfaces, and similar preparations for finishing paneling, as applicable to
- 36 each unit of work.
- 37 1. Backpriming: Apply two coats of sealer or primer, compatible with finish coats, to concealed
- 38 surfaces of paneling.
- 39 D. Transparent Finish:
- 40 1. Grade: Custom.
- 41 2. Finish: System - 4, water-based latex acrylic.

42 **PART 3 - EXECUTION**

43 **3.1 PREPARATION**

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

47 **3.2 INSTALLATION**

- 48 A. Grade: Install paneling to comply with quality standard grade of paneling to be installed.
- 49 B. Install paneling level, plumb, true in line, and without distortion. Shim as required with concealed shims.
- 50 Install level and plumb to a tolerance of 1/8 inch in 96 inches. Install with no more than 1/16 inch in 96-inch
- 51 vertical cup or bow and 1/8 inch in 96-inch horizontal variation from a true plane.
- 52 1. For flush paneling with revealed joints, install with variations in reveal width, alignment of top and
- 53 bottom edges, and flushness between adjacent panels not exceeding [1/32 inch] [1/16 inch].

- 1 C. Anchor paneling to supporting substrate with [concealed panel-hanger clips] [splined connection strips]
2 [blind nailing].
3 1. Do not use face fastening.

4 **3.3 ADJUSTING AND CLEANING**

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

8 **END OF SECTION**

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SECTION 07 01 50.19

PREPARATION FOR REROOFING

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [DEFINITIONS](#)
- 1.4 [PREINSTALLATION MEETINGS](#)
- 1.5 [ACTION SUBMITTALS](#)
- 1.6 [INFORMATIONAL SUBMITTALS](#)
- 1.7 [CLOSEOUT SUBMITTALS](#)
- 1.8 [QUALITY ASSURANCE](#)
- 1.9 [FIELD CONDITIONS](#)
- 1.10 [WARRANTY](#)

PART 2 – PRODUCTS

- 2.1 [TEMPORARY PROTECTION MATERIALS](#)
- 2.2 [AUXILIARY REROOFING MATERIALS](#)

PART 3 – EXECUTION

- 3.1 [PREPARATION](#)
- 3.2 [DECK PREPARATION](#)
- 3.3 [BASE FLASHING REMOVAL](#)
- 1.3 [DISPOSAL](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Partial tear-off of roof areas indicated on Drawings.
 - 2. Re-cover preparation of roof areas indicated on Drawings.
 - 3. Removal of flashings and counterflashings.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for use of premises and for phasing requirements.
 - 2. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 3. Section 01 50 00 "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for reroofing preparation.

1.3 DEFINITIONS

- A. EPS: Molded (expanded) polystyrene.
- B. Full Roof Tear-off: Removal of existing roofing system down to existing roof deck.
- C. OSB: Oriented strand board.
- D. Partial Roof Tear-off: Removal of selected components and accessories from existing roofing system.
- E. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing tear-off, including, but not limited to, the following:
 - a. Reroofing preparation, including roofing system manufacturer's written instructions.
 - b. Temporary protection requirements for existing roofing system components that are to remain.

- 1 c. Existing roof drains and roof drainage during each stage of reroofing, and roof-drain
- 2 plugging and plug removal.
- 3 d. Construction schedule and availability of materials, Installer's personnel, equipment, and
- 4 facilities needed to avoid delays.
- 5 e. Existing roof deck conditions requiring Architect notification.
- 6 f. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
- 7 g. Structural loading limitations of roof deck during reroofing.
- 8 h. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and
- 9 condition of other construction that affect reroofing.
- 10 i. Governing regulations and requirements for insurance and certificates if applicable.
- 11 j. Existing conditions that may require Architect notification before proceeding.

12 **1.5 ACTION SUBMITTALS**

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

14 **1.6 INFORMATIONAL SUBMITTALS**

- 15 A. Qualification Data: For Installer.
- 16 1. Include certificate that Installer is approved by warrantor of existing roofing system.
- 17 B. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements,
- 18 including exterior and interior finish surfaces that might be misconstrued as having been damaged by
- 19 reroofing operations.
- 20 1. Submit before Work begins.
- 21 C. Landfill Records: Indicate receipt and acceptance of demolished roofing materials by a landfill facility
- 22 licensed to accept them.

23 **1.7 CLOSEOUT SUBMITTALS**

- 24 A. Certified statement from Firestone Building Products stating that existing roof warranty has not been
- 25 affected by Work performed under this Section.

26 **1.8 QUALITY ASSURANCE**

- 27 A. Installer Qualifications: Approved by warrantor of existing roofing system to work on existing roofing.
- 28 B. Regulatory Requirements:
- 29 1. Comply with governing EPA notification regulations before beginning roofing removal.
 - 30 2. Comply with hauling and disposal regulations of authorities having jurisdiction.

31 **1.9 FIELD CONDITIONS**

- 32 A. Existing Roofing System: EPDM roofing. Refer to attached current roof warranty issued by Firestone
- 33 Building Products, 20 year term issued May 05, 2014.
- 34 B. Owner will not occupy portions of building immediately below reroofing area.
- 35 C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and
- 36 landscaping from damage or soiling from reroofing operations.
- 37 D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- 38 E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
- 39 F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather
- 40 conditions permit Work to proceed without water entering existing roofing system or building.
- 41 1. Remove only as much roofing in one day as can be made watertight in the same day.
- 42 G. Hazardous Materials: It is not expected that hazardous materials, such as asbestos-containing materials,
- 43 will be encountered in the Work.
- 44 1. If materials suspected of containing hazardous materials are encountered, do not disturb;
 - 45 immediately notify Architect and Owner.
 - 46 a. Hazardous materials will be removed by Owner under a separate contract.

47 **1.10 WARRANTY**

- 48 A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during
- 49 reroofing, by methods and with materials so as not to void existing roofing system warranty issued by
- 50 Firestone Building Products.
- 51 1. Notify warrantor before proceeding with the Work.
 - 52 2. Notify warrantor of existing roofing system on completion of reroofing, and obtain documentation
 - 53 verifying that existing roofing system has been inspected and warranty remains in effect.
 - 54 a. Submit documentation at Project closeout.

1 **PART 2 - PRODUCTS**

2 **2.1 TEMPORARY PROTECTION MATERIALS**

- 3 A. EPS Insulation: ASTM C578.
- 4 B. Plywood: DOC PS 1, Grade CD, Exposure 1.
- 5 C. OSB: DOC PS 2, Exposure 1.

6 **2.2 AUXILIARY REROOFING MATERIALS**

- 7 A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for
8 intended use and compatible with components of existing and new roofing system.

9 **PART 3 - EXECUTION**

10 **3.1 PREPARATION**

- 11 A. Protection of In-Place Conditions:
 - 12 1. Protect existing roofing system that is not to be reroofed.
 - 13 2. Loosely lay 1-inch-minimum thick, EPS insulation over existing roofing in areas not to be reroofed.
 - 14 a. Loosely lay 15/32-inch plywood or OSB panels over EPS. Extend EPS past edges of
15 plywood or OSB panels a minimum of 1 inch.
 - 16 3. Limit traffic and material storage to areas of existing roofing that have been protected.
 - 17 4. Maintain temporary protection and leave in place until replacement roofing has been completed.
18 Remove temporary protection on completion of reroofing.
 - 19 5. Comply with requirements of existing roof system manufacturer's warranty requirements.
- 20 B. Test existing roof drains to verify that they are not blocked or restricted.
 - 21 1. Immediately notify Architect of any blockages or restrictions.
- 22 C. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday.
 - 23 1. Prevent debris from entering or blocking roof drains and conductors.
 - 24 a. Use roof-drain plugs specifically designed for this purpose.
 - 25 b. Remove roof-drain plugs at end of each workday, when no work is taking place, or when
26 rain is forecast.
 - 27 2. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial
28 installation of new roofing system, provide alternative drainage method to remove water and
29 eliminate ponding.
 - 30 a. Do not permit water to enter into or under existing roofing system components that are to
31 remain.

32 **3.2 DECK PREPARATION**

- 33 A. Inspect deck after tear-off of roofing system.
- 34 B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck
35 appears or feels inadequately attached, immediately notify Architect.
 - 36 1. Do not proceed with installation until directed by Architect.
- 37 C. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect,
38 immediately notify Architect.
 - 39 1. Do not proceed with installation until directed by Architect.

40 **3.3 BASE FLASHING REMOVAL**

- 41 A. Remove existing base flashings.
 - 42 1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.
- 43 B. Do not damage metal counterflashings that are to remain.
 - 44 1. Replace metal counterflashings damaged during removal with counterflashings of same metal,
45 weight or thickness, and finish as existing.

46 **3.4 DISPOSAL**

- 47 A. Collect demolished materials and place in containers.
 - 48 1. Promptly dispose of demolished materials.
 - 49 2. Do not allow demolished materials to accumulate on-site.
 - 50 3. Storage or sale of demolished items or materials on-site is not permitted.
- 51 B. Transport and legally dispose of demolished materials off Owner's property.

52 **END OF SECTION**

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RED SHIELD WARRANTY



RED SHIELD ROOFING SYSTEM LIMITED WARRANTY

Warranty No: R0065815 FBPCO #: CF6414 Square Footage: 39820 s.f.
Building Owner: CITY OF MADISON - CITY ENGINEERING DIVIS
Building Identification: FLEET SERVICES ROOF REPLACEMENT
Building Address: 200 N. FIRST ST., MADISON, WI, 53704-4705
Warranty Period Of: TWENTY (20) Years, Beginning On: 05/05/14
Roofing Contractor: MALY ROOFING COMPANY, INC. (05091)

For the warranty period indicated above, Firestone Building Products Company, LLC ("Firestone"), an Indiana limited liability company, warrants to the Building Owner ("Owner") named above that Firestone will, subject to the Terms, Conditions and Limitations set forth below, repair any leak in the Firestone Roofing System ("System").

TERMS, CONDITIONS AND LIMITATIONS

- Products Covered.** The System shall mean only the Firestone brand roofing membranes, Firestone brand roofing insulations, Firestone brand roofing metal, and other Firestone brand roofing accessories when installed in accordance with Firestone technical specifications by a Firestone-licensed applicator.
- Notice.** In the event any leak should occur in the System, the Owner must give notice in writing or by telephone to Firestone within thirty (30) days of any occurrence of a leak. Written notice may be sent to Firestone at the street address or fax number shown on the reverse side of this Limited Warranty. Evidence of this notice shall be the receipt by Owner of a Firestone Leak Notification Acknowledgement. By so notifying Firestone, the Owner authorizes Firestone of its designee to investigate the cause of the leak.
- Investigation.** If upon investigation, Firestone determines that the leak is not excluded under the Terms, Conditions and Limitations set forth in this Red Shield Roofing System Limited Warranty (the "Limited Warranty"), the Owner's sole and exclusive remedy and Firestone's total liability shall be limited to the repair of the leak. Should the investigation reveal that the leak is excluded under the Terms, Conditions and Limitations, the Owner shall be responsible for payment of the investigation costs. Failure by Owner to pay for these costs shall render this Limited Warranty null and void. Firestone will advise the Owner of the type and/or extent of repairs required to be made at the Owner's expense that will permit this Limited Warranty to remain in effect for the unexpired portion of its term. Failure by the Owner to properly make these repairs in a reasonable manner using a Firestone-licensed applicator and within 60 days shall render this Limited Warranty null and void.
- No Dollar Limit (NDL).** There is no dollar limit placed on warranted leak repairs to the extent such repairs are covered by this Limited Warranty.
- Disputes.** Any dispute, controversy or claim between the Owner and Firestone concerning this Limited Warranty shall be settled by mediation. In the event that the Owner and Firestone do not resolve the dispute, controversy or claim in mediation, the Owner and Firestone agree that neither party will commence or prosecute any suit, proceeding, or claim other than in the courts of Hamilton County in the state of Indiana or the United States District Court, Southern District of Indiana, Indianapolis Division. Each party irrevocably consents to the jurisdiction and venue of the above-identified courts.
- Payment Required.** Firestone shall have no obligation under this Limited Warranty unless and until Firestone and the licensed applicator have been paid in full for all materials, supplies, services, approved written change orders, warranty costs and other costs which are included in, or incidental to, the System. In the event that repairs not covered by this Limited Warranty are necessary in the future, Firestone reserves the right to suspend this Limited Warranty until such repairs have been completed and the licensed applicator and/or Firestone has been paid in full for such repairs.
- Exclusions.** Firestone shall have no obligation under this Limited Warranty, or any other liability, now or in the future if a leak or damage is caused by:
(a) Natural forces, disasters, or acts of God including, but not limited to; fires, hurricanes, tornadoes, hail, wind-blown debris, lightning, earthquakes, volcanic activity, atomic radiation, insects or animals; (b) Winds of peak gust speed at or in excess of .55MPH calculated at ten(10) meters above ground using available meteorological data; (c) Act(s), conduct or omission(s) by any person, or act(s) of war, terrorism or vandalism, which damage the System or which impair the System's ability to resist leaks; (d) Failure by the Owner to use reasonable care in maintaining the System, said maintenance to include, but not be limited to, those items listed on the reverse side of this Limited Warranty entitled "Building Envelope Care and Maintenance Guide"; (e) Deterioration or failure of building components, including, but not limited to; the roof substrate, walls, mortar, HVAC units, skylights etc.; (f) Construction generated moisture, condensation or infiltration of moisture in, from, through, or around the walls, copings, rooftop hardware or equipment, skylights, building structure or underlying or surrounding materials; (g) Acid, oil, harmful chemicals, or the reaction between them; (h) Alterations or repairs to the System that are not completed in accordance with Firestone's published specifications, not completed by an approved contractor, and/or not completed with proper notice to Firestone; (i) The design of the roofing system: Firestone does not undertake any analysis of the architecture or engineering required to evaluate what type of System is appropriate for a building and makes no warranty express or implied as to the suitability of its Products for any particular structure; such a determination is the responsibility of the architect, engineer or design professional; (j) Improper selection of materials for the roof assembly or the failure to accurately calculate wind uplift and/or roof loads; (k) Deterioration to metal roofing materials and accessories caused by marine salt water; atmosphere, or by regular spray of either salt or fresh water; or, (l) Change in building use or purpose.
- Transfer.** This Limited Warranty shall be transferable subject to Owner's payment of the current transfer fee set by Firestone.
- Term.** The term of this Limited Warranty shall be for the period set forth above and such term shall not be extended under any circumstances.
- Roof Access.** During the term of this Limited Warranty, Firestone's designated representative or employees shall have free access to the roof during regular business hours. In the event that roof access is limited due to security or other restrictions, Owner shall reimburse Firestone for all reasonable cost incurred during inspection and/or repair of the System that are due to delays associated with said restrictions. Owner shall be responsible for the damage caused by, removal and replacement of any overburdens, superstrata or overlays, either permanent or temporary, excluding accepted stone, ballast or pavers, as necessary to expose the system for inspection and/or repair.
- Waiver.** Firestone's failure to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.
- Governing Law.** This Limited Warranty shall be governed by and construed in accordance with the laws of the State of Indiana without regard to that State's rules on conflict of laws.
- Severability.** If any portion of this Limited Warranty is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force.

FIRESTONE DOES NOT WARRANT PRODUCTS INCORPORATED OR UTILIZED IN THIS INSTALLATION THAT WERE NOT FURNISHED BY FIRESTONE. FIRESTONE SPECIFICALLY DISCLAIMS LIABILITY UNDER ANY THEORY OF LAW ARISING OUT OF THE INSTALLATION OF, PERFORMANCE OF, OR DAMAGES SUSTAINED BY OR CAUSED BY, PRODUCTS NOT FURNISHED BY FIRESTONE.

THIS LIMITED WARRANTY SUPERSEDES AND IS IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND FIRESTONE HEREBY DISCLAIMS ALL SUCH WARRANTIES. THIS LIMITED WARRANTY SHALL BE THE OWNER'S SOLE AND EXCLUSIVE REMEDY AGAINST FIRESTONE, AND FIRESTONE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR DAMAGES TO THE BUILDING OR ITS CONTENTS OR THE ROOF DECK. THIS LIMITED WARRANTY CANNOT BE AMENDED, ALTERED OR MODIFIED IN ANY WAY EXCEPT IN WRITING SIGNED BY AN AUTHORIZED OFFICER OF FIRESTONE. NO OTHER PERSON HAS ANY AUTHORITY TO BIND FIRESTONE WITH ANY REPRESENTATION OR WARRANTY WHETHER ORAL OR WRITTEN.

FIRESTONE BUILDING PRODUCTS COMPANY, LLC

By: Phil LaDuke

Authorized

Signature:

Title:

Director, Quality Assurance

BUILDING ENVELOPE CARE AND MAINTENANCE GUIDE
(For Red Shield Warranted Roofing Systems)

Congratulations on your purchase of a Firestone Roofing System! Your roof is a valuable asset that should be properly maintained. **All roofs and roofing systems require periodic inspection and maintenance to perform as designed and to keep your Limited Warranty in full force and effect.**

1. The roof should be inspected at least twice yearly and after any severe storms. A record of all inspection and maintenance activities should be maintained, including a listing of the date and time of each activity as well as the identification of the parties performing the activity.
2. Proper maintenance and good roofing practice require that ponded water (defined as water standing on the roof forty-eight hours after it stops raining) not be allowed on the roof. Roofs should have slope to drain, and all drain areas must remain clean. Bag and remove all debris from the roof since such debris can be quickly swept into drains by rain. This will allow for proper water run-off and avoid overloading the roof.
3. The Firestone Roofing System should not be exposed to acids, solvents, greases, oil, fats, chemicals and the like. If the Firestone Roofing System is in contact with any such materials, these contaminants should be removed immediately and any damaged areas should be inspected by a Firestone Licensed Applicator and repaired if necessary.
4. The Firestone Roofing System is designed to be a waterproofing membrane and not a traffic surface. Roof traffic other than periodic traffic to maintain rooftop equipment and conduct periodic inspections should be prohibited. In any areas where periodic roof traffic may be required to service rooftop equipment or to facilitate inspection of the roof, protective walkways should be installed by a Firestone Licensed Applicator as needed to protect the roof surface from damage.
5. Some Firestone roofing membranes require maintenance of the surface of the membrane:
 - a. **Smooth-surfaced Firestone APP membranes** should be coated with an approved liquid coating, such as Firestone Aluminum Roof Coating or Firestone AcryliTop applied in accordance with Firestone specifications, in order to maximize the service life of the membrane. If this coating is not applied as part of the initial roofing installation, it should be applied within the first five years after the roof is installed to help protect the membrane from surface crazing and cracking. In addition, this coating should be maintained as needed to re-coat any areas that have blistered, peeled or worn through.
 - b. **Granule-surfaced Firestone APP and SBS membranes** do not normally require surface maintenance other than periodic inspection for contaminants, cuts or punctures. If areas of granular loss are discovered during inspection, these areas should be coated with Firestone AcryliTop or other Firestone-approved coating applied in accordance with Firestone specifications.
 - c. **Gravel-surfaced Firestone BUR membranes** do not normally require surface maintenance other than periodic inspection for contaminants or damage. If areas of gravel loss are discovered during inspection, gravel must be reinstalled into hot asphalt to protect the surface of the membrane. Coatings on smooth surface BUR membranes must be maintained as needed to re-coat any areas that have blistered, peeled or worn through.
 - d. **Firestone EPDM and TPO roofing membranes** do not normally require surface maintenance other than periodic inspection for contaminants, cuts or punctures. Occasionally, approved liquid roof coatings, such as Firestone AcryliTop, are applied to the surface of EPDM membranes in order to provide a lighter surface color. Such coatings do not need to be maintained to assure the performance of the underlying EPDM roof membrane, but some maintenance and re-coating may be necessary in order to maintain a uniform surface appearance.
 - e. **Firestone Una-Clad metal roofing panels and trim** do not normally require surface maintenance other than periodic inspection for contaminants or damage. In addition, periodic cleaning of the surface may be required to remove dirt and maintain the aesthetic appearance of the coated metal. Simple washing with plain water using hoses or pressure spray equipment is usually adequate. If cleaning with agents other than water is contemplated, several precautions should be observed: (1) do not use wire brushes, abrasives, or similar cleaning tools which will mechanically abrade the coating surface, and (2) cleaning agents should be tested in an inconspicuous area before use on a large scale.
6. All metal work, including counter-flashings, drains, skylights, equipment curbs and supports, and other Firestone brand rooftop accessories must be properly maintained at all times. Particular attention should be paid to sealants at joints in metal work and flashings. If cracking or shrinkage is observed, the joint sealant should be removed and replaced with new sealant.
7. Any alterations to the roof, including but not limited to roof curbs, pipe penetrations, roof-mounted accessories, and tie-ins to building additions must be performed by a licensed Firestone Licensed Applicator and reported to Firestone. Additional information and reporting forms for roof alterations are available at www.firestonebpco.com.
8. Should you experience a leak:
 - (a) Check for the obvious: clogged roof drains, loose counterflashings, broken skylights, open grills or vents, broken water pipes.
 - (b) Note conditions resulting in leakage. Heavy or light rain, wind direction, temperature and time of day that the leak occurs are all-important clues to tracing roof leaks. Note whether the leak stops shortly after each rain or continues to drip until the roof is dry. If you are prepared with the facts, the diagnosis and repair of the leak can proceed more rapidly.
 - (c) Contact Firestone Warranty Claims at 1-800-830-5612 as soon as possible...but please don't call until you are reasonably sure that the Firestone Roofing System is the cause of the leak.

Firestone feels that the preceding requirements will assist you, the building owner, in maintaining a watertight roof for many years. Your roof is an investment, and maintenance is essential to maximize your return on this important investment.

Firestone
BUILDING PRODUCTS

NOBODY COVERS YOU BETTER™

250 West 96th Street – Indianapolis, IN 46260
1-800-428-4442 * 1-317-575-7000 * FAX 1-317-575-7100
www.firestonebp.com

SECTION 07 14 16
COLD FLUID-APPLIED WATERPROOFING

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Latex-rubber waterproofing.
 - a. Vertical Applications: Membrane applied to fully cured poured in place concrete.
 - b. Horizontal Applications: Membrane applied on prepared subbase prior to placement of concrete slabs.
 2. Foundation protection drainage mat.
- B. Related Requirements:
1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 2. Section 07 21 00 "Thermal Insulation" for below grade perimeter insulation.
 3. Section 09 30 13 "Ceramic Tiling" for fluid-applied waterproof membranes beneath ceramic tiles.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
- B. Review waterproofing requirements including, but not limited to, the following:
1. Surface preparation specified in other Sections.
 2. Minimum curing period.
 3. Forecasted weather conditions.
 4. Special details and sheet flashings.
 5. Repairs.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
- B. Shop Drawings:
1. Show locations and extent of waterproofing.
 2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

- 1 3. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-
2 supported concrete pavers.

3 **1.5 INFORMATIONAL SUBMITTALS**

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

6 **1.6 QUALITY ASSURANCE**

- 7 A. Materials: For each type of material required for the work of this section, provide primary materials which
8 are the products of one manufacturer.
9 B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
10 waterproofing manufacturer.

11 **1.7 FIELD CONDITIONS**

- 12 A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures
13 recommended in writing by waterproofing manufacturer.
14 1. Do not apply waterproofing to a damp or wet substrate, when relative humidity exceeds 85 percent,
15 or when temperatures are less than 5 deg F above dew point.
16 2. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are
17 imminent during application and curing period.
18 B. Maintain adequate ventilation during application and curing of waterproofing materials.

19 **1.8 WARRANTY**

- 20 A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in
21 materials or workmanship within specified warranty period.
22 1. Warranty Period: Five years from date of Substantial Completion.

23 **PART 2 - PRODUCTS**

24 **2.1 MATERIALS, GENERAL**

- 25 A. Source Limitations for Waterproofing System: Obtain waterproofing materials from single source from
26 single manufacturer.

27 **2.2 LATEX-RUBBER WATERPROOFING (WP-1)**

- 28 A. Two-Component, Unreinforced, Latex-Rubber Waterproofing: ASTM C 836/C 836M; coal-tar free.
29 1. Products: Subject to compliance with requirements, provide one of the following:
30 a. Basis of Design: Grace Construction Products; W.R. Grace & Co. -- Conn; Procor 75.
31 b. Carlisle Coatings and Waterproofing; Miraseal.
32 c. Comparable product by Polyguard Inc.; Pro 1000.
33 2. Hydrostatic-Head Resistance: 65 feet minimum; ASTM D 5385.
34 3. Thickness: 60 mil (1.5 mm).

35 **2.3 LATEX-RUBBER WATERPROOFING (WP-2)**

- 36 A. Pre-applied Integrally Bonded Sheet Waterproofing Membrane: composite sheet membrane comprising
37 high density polyethylene film, and layers of specially formulated synthetic adhesive. The membrane shall
38 form an integral and permanent bond to poured concrete to prevent water migration at the interface of the
39 membrane and structural concrete. ASTM C 836/C 836M; coal-tar free.
40 1. Products: Subject to compliance with requirements, provide one of the following:
41 a. Basis of Design: Grace Construction Products; W.R. Grace & Co. -- Conn; Prepruf 300R.
42 b. Carlisle Coatings and Waterproofing; MiraPLY-H
43 c. Comparable product by Polyguard Inc.: Underseal Underslab Membrane.
44 2. Hydrostatic-Head Resistance: 231 feet minimum; ASTM D 5385.
45 3. Thickness: 46 mil (1.2 mm) nominal thickness.
46

1 **2.4 AUXILIARY MATERIALS**

- 2 A. General: Provide auxiliary materials recommended in writing by waterproofing manufacturer for intended
3 use and compatible with one another and with waterproofing.
4 1. Provide pourable and trowel grade waterproofing auxiliary detailing materials that comply with VOC
5 limits of authorities having jurisdiction.
6 2. Provide tape and other accessories specified or acceptable to manufacturer of fluid applied
7 waterproofing membrane.

8 **2.5 MOLDED-SHEET DRAINAGE PANELS**

- 9 A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel
10 consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-
11 punched geotextile facing laminated to one side of the core and a polymeric film bonded to the other side;
12 and with a vertical flow rate of 9 to 18 gpm per ft.
13 1. Basis of Design: Henry DB200 Prefabricated Drainage Composites.
14 2. Comparable drainage mat by waterproofing manufacturer to comply with warranty.

15 **PART 3 - EXECUTION**

16 **3.1 EXAMINATION**

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

24 **3.2 PREPARATION**

- 25 A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-
26 free, and dry substrates for waterproofing application.
27 1. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting
28 other construction.
29 2. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and
30 other penetrating contaminants or film-forming coatings from concrete.
31 3. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and
32 other voids.
33 B. Horizontal Surfaces - The substrate shall be free of loose aggregate and sharp protrusions. Avoid curved
34 or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to
35 avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but
36 standing water must be removed.

37 **3.3 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS**

- 38 A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains,
39 sleeves, and corners according to waterproofing manufacturer's written instructions and to
40 recommendations in ASTM C 1471.
41 B. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation
42 coat when recommended by waterproofing manufacturer.

43 **3.4 JOINT AND CRACK TREATMENT**

- 44 A. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written
45 instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471. Before coating
46 surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.
47 1. Comply with ASTM C 1193 for joint-sealant installation.
48 2. Apply bond breaker on sealant surface, beneath preparation strip.
49 3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least 6
50 inches wide along each side of joint. Apply waterproofing in two separate applications and embed
51 a joint reinforcing strip in the first preparation coat.
52 B. Install sheet flashing and bond to deck and wall substrates where required according to waterproofing
53 manufacturer's written instructions.

SECTION 07 21 00
THERMAL INSULATION

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23 **PART 1 - GENERAL**

24 **1.1 RELATED DOCUMENTS**

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

27 **1.2 SUMMARY**

- 28 A. Section Includes:
29 1. Extruded polystyrene foam-plastic board.
30 2. Polyisocyanurate foam-plastic board.
31 3. Mineral-wool blanket.
32 4. Mineral-wool board.
33 B. Related Sections:
34 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
35 2. Section 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for INSUL-4

36 **1.3 ACTION SUBMITTALS**

- 37 A. Product Data: For each type of product.
38 B. Sustainable Design Submittals:
39 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and
40 cost.
41 2. Product Data: For adhesives, indicating VOC content.
42 3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting
43 materials.

44 **1.4 INFORMATIONAL SUBMITTALS**

- 45 A. Product test reports.
46 B. Research reports.
47

1 **1.5 DELIVERY, STORAGE, AND HANDLING**

- 2 A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other
3 sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling,
4 storing, and protecting during installation.
5 B. Protect foam-plastic board insulation as follows:
6 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
7 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until
8 just before installation time.
9 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of
10 construction.

11 **PART 2 - PRODUCTS**

12 **2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD**

- 13 A. Extruded Polystyrene Board, Type VII (**INSUL-5**): ASTM C 578, Type VII, 60-psi minimum compressive
14 strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per
15 ASTM E 84.
16 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
17 that may be incorporated into the Work include, but are not limited to, the following:
18 a. DiversiFoam Products.
19 b. Dow Chemical Company (The).
20 c. Owens Corning.
21 B. Extruded Polystyrene Board, Type IV (**INSUL-2**): ASTM C578, Type IV, 25-psi (173-kPa) minimum
22 compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450,
23 respectively, per ASTM E84.
24 1. Fire Propagation Characteristics (where required): Passes NFPA 285 testing as part of an approved
25 assembly.
26 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
27 that may be incorporated into the Work include, but are not limited to, the following:
28 a. DiversiFoam Products.
29 b. Dow Chemical Company (The).
30 c. Owens Corning.

31 **2.2 POLYISOCYANURATE FOAM-PLASTIC BOARD (INSUL-3)**

- 32 A. Polyisocyanurate Board Insulation Bonded to Plywood (**INSUL-3B**):
33 1. Application: Loading dock area walls to height above finished floor as indicated.
34 2. Basis-of-Design Product: Subject to compliance with requirements, provide Hunter Panels Xci Ply or
35 comparable product by one of the following:
36 a. Atlas Roofing Corporation.
37 b. Rmax, Inc.
38 3. Foam Core: Grade 2 (20 psi).
39 4. Fire Retardant Treated Plywood Thickness: 3/4 inch.
40 5. Panel Size: 4 feet by 8 feet.
41 6. Thickness / R Value: based on ASTM C 518 at 75 degrees F (23.9 degrees C)
42 a. 2.7 inches (69 mm) / R Value 13.1 with 3/4 inch plywood facing.
43 7. Physical properties (Foam Core):
44 a. Flame Spread Index: ASTM E 84; less than 75
45 b. Smoke Developed: ASTM E 84; less than 450.
46 8. Fire Retardant Treated Plywood:
47 a. Flame Spread Index: ASTM E 84; less than 25
48 b. Smoke Developed: ASTM E 84; less than 250.
49 B. Polyisocyanurate Board, Foil Faced: ASTM C 1289, foil faced, Type I, Class 1 or 2. (**INSUL-3A**)
50 1. Application: Loading dock area walls above plywood faced panels and on ceiling.
51 2. Product: Thermax Heavy Duty Plus thickness: 2 inches, facing: 16.5 mil embossed aluminum / 1 mil
52 embossed aluminum. Install with 16.5 mil side as finish face. White. Standard J trim at material
53 termination, standard interlocking system at panel joints.
54 3. Basis-of-Design Product: Subject to compliance with requirements, provide Dow Chemical
55 Company Thermax Heavy-Duty Plus or comparable product by one of the following:
56 a. Atlas Roofing Corporation.
57 b. Hunter Panels.

- 1 c. Rmax, Inc.
- 2 4. Fire Propagation Characteristics:
- 3 a. Passes NFPA 285 testing as part of an approved assembly.
- 4 b. Maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM
- 5 E 84.
- 6 C. Trim Accessories:
- 7 1. As detailed and indicated on Drawings.
- 8 2. Adhesive application as recommended by manufacturer.
- 9 3. Trim: Butt joint and edge panel trim. Non-metallic profiles adhesively secured.

10 2.3 GLASS-FIBER BLANKET (INSUL-1)

- 11 A. Glass-Fiber Blanket, Unfaced: ASTM C665, Type I; with maximum flame-spread and smoke-developed
- 12 indexes of 25 and 50, respectively, per ASTM E84; passing ASTM E136 for combustion characteristics.
- 13 1. Basis of Design: EcoTouch® Unfaced Batt Insulation: ASTM C 665, Type I, preformed formaldehyde
- 14 free glass fiber batt type, unfaced. Non-toxic acrylic thermosetting resin.
- 15 2. Water vapor sorption, Maximum by weight: not more than 5 percent.
- 16 3. Sustainable Design: Provide products which have received the following certifications:
- 17 a. UL Certified Environmental Product Declaration in accordance with ISO 14025.
- 18 b. UL Environment EcoLogo CCD-106, applies to EcoTouch® Faced and Unfaced insulation.
- 19 c. GREENGUARD Indoor Air Quality Certified® and GREENGUARD Children & Schools
- 20 Certified
- 21 d. GREENGUARD Formaldehyde Free.
- 22 e. Scientific Certification Systems SCS-MC-01025, SCS Certified minimum 65% recycled glass
- 23 content (with at least 41% post-consumer recycled and the balance of pre-consumer recycled
- 24 glass content).
- 25 f. USDA Certified Biobased Products: 98 percent.

26 2.4 MINERAL-WOOL BLANKETS

- 27 A. Mineral-Wool Board (INSUL-8), Types IA and IB, Unfaced: ASTM C612, Types IA and IB; with maximum
- 28 flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E84; passing
- 29 ASTM E136 for combustion characteristics. Nominal density of 4 lb/cu. ft. (64 kg/cu. m).
- 30 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
- 31 that may be incorporated into the Work include, but are not limited to, the following:
- 32 a. Industrial Insulation Group, LLC (IIG-LLC).
- 33 b. Roxul Inc.
- 34 c. Thermafiber Inc.; an Owens Corning company.
- 35 B. Recycled Content: Postconsumer recycled content plus one-half of Pre-consumer recycled content not less
- 36 than 35 percent. Pre consumer = 70%. Post-consumer = 0%.

37 2.5 ACCESSORIES

- 38 A. Insulation for Miscellaneous Voids:
- 39 1. Mineral-Fiber Fire Stopping Material (INSUL-6): ASTM C612, Type IVA Compliant, loose fill; with
- 40 maximum flame-spread and smoke-developed indexes of 0, per ASTM E 84.
- 41 a. Behavior of Materials at 750°C (ASTM E136): Non-Combustible.
- 42 2. Spray Polyurethane Foam Insulation (INSUL-7): ASTM C 1029, Type II, closed cell, with maximum
- 43 flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
- 44 B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.
- 45 C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and
- 46 with demonstrated capability to bond insulation securely to substrates without damaging insulation and
- 47 substrates.
- 48 1. Adhesives shall have a VOC content of 70 g/L or less.

49 PART 3 - EXECUTION

50 3.1 PREPARATION

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

53 3.2 INSTALLATION, GENERAL

- 54 A. Comply with insulation manufacturer's written instructions applicable to products and applications.

- 1 B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or
2 snow at any time.
3 C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with
4 insulation. Remove projections that interfere with placement.
5 D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths.
6 Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total
7 thickness or to achieve R-value.

8 **3.3 INSTALLATION OF SLAB INSULATION**

- 9 A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended
10 adhesive according to manufacturer's written instructions.
11 1. If not otherwise indicated, extend insulation a minimum of **24 inches** below exterior grade line.
12 B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger
13 end joints and tightly abut insulation units.
14 1. If not otherwise indicated, extend insulation a minimum of **24 inches** in from exterior walls.

15 **3.4 INSTALLATION OF FOUNDATION WALL INSULATION**

- 16 A. Butt panels together for tight fit.
17 B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type
18 insulation anchors.
19 C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to
20 manufacturer's written instructions.

21 **3.5 INSTALLATION OF CAVITY-WALL INSULATION**

- 22 A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on
23 inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other
24 obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
25 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed
26 for this purpose and specified in Section 04 20 00 "Unit Masonry."

27 **3.6 INSTALLATION OF INSULATION IN VOID SPACES AND OPEN JOINTS**

- 28 A. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent
29 gaps in insulation using the following materials:
30 1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling
31 a density of approximately 2.5 lb/cu. ft..
32 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

33 **3.7 PROTECTION**

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

37 **END OF SECTION**

SECTION 07 21 29

SPRAYED CELLULOSE ACOUSTICAL INSULATION

PART 1 – GENERAL

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PART 3 – EXECUTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Sprayed cellulose acoustical insulation (indicated as SAI-1 on the Drawings).
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 07 21 00 "Thermal Insulation" for foam-plastic board insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainability:
 - 1. Low Chemical Emissions: Certificate of Compliance GreenGuard Gold.
- C. Manufacturer's Written Certification:
 - 1. Product contains no asbestos, fiberglass or other man-made mineral fibers.
 - 2. Recycled Content: Minimum fiber recycled content shall no less than 75%.
 - 3. Materials shall not contain any added Urea-Formaldehyde Resins.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.5 QUALITY ASSURANCE

- A. Manufacturer shall have a current Underwriters Laboratories (UL) Code Evaluation Report.
- B. Manufacturer shall be in compliance with the 2009 and 2012 International Building Code.
- C. Manufacturer shall subscribe to independent laboratory follow-up inspection services of Underwriters Laboratories and Factory Mutual. Each bag shall be labeled accordingly.
- D. Applicator: Licensed by manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver in original, unopened containers bearing name of manufacturer, product identification and reference to U.L. testing.
- B. Store materials dry, off ground, and under cover.
- C. Protect liquid adhesive from freezing.
- D. Water to be potable.

1 **PART 2 - PRODUCTS**

2 **2.1 SPRAY-ON SYSTEM (SPAC-1)**

- 3 A. Performance:
- 4 1. Bond strength shall be greater than 100 psf per ASTM E 736.
 - 5 2. Product shall be Class 1 Class A per ASTM E 84/ UL 723.
 - 6 3. Non-corrosive per ASTM C 739.
 - 7 4. Bond Deflection per ASTM E 759: 6" Deflection in 10' Span – No Spalling or Delamination.
 - 8 5. R-Value shall be 3.75 per inch per ASTM C518.
 - 9 6. Comply with IBC 803.3/2009 IBC 803.10 stability requirements for interior finishes.
 - 10 7. Meet ASTM C 1149.
 - 11 8. Low Chemical Emissions (UL 2818 - 2013 Gold Standard for Chemical Emissions for Building
12 Materials, Finishes and Furnishings). GreenGuard Gold.
- 13 B. Basis-of-Design Product: Subject to compliance with requirements, provide International Cellulose
14 Corporation - K-13 Spray-On-Systems or comparable product by one of the following:
- 15 1. Applegate Insulation.
- 16 C. Material:
- 17 1. Color: Refer to Material ID List.
 - 18 2. Comply with local Building Code requirements.
 - 19 3. Material shall have been tested in accordance with ASTM E 1042. Testing laboratory shall be
20 NVLAP accredited.

21 **2.2 MISCELLANEOUS MATERIALS**

- 22 A. Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to
23 substrates.

24 **PART 3 - EXECUTION**

25 **3.1 EXAMINATION**

- 26 A. Examine surfaces and report unsatisfactory conditions in writing. Do not proceed until unsatisfactory
27 conditions are corrected.
- 28 B. Verify surfaces to receive spray insulation to determine if priming/sealing is required to insure bonding
29 and/or to prevent discoloration caused by migratory stains.

30 **3.2 PREPARATION**

- 31 A. Clips, hangers, supports, sleeves and other attachments to spray bases are to be placed by other trades
32 prior to the application of sprayed insulation.
- 33 B. Ducts, piping, conduit or other suspended equipment shall not be positioned until after the application of
34 sprayed insulation.
- 35 C. Provide masking, drop cloths or other satisfactory coverings for materials/surfaces that are not to receive
36 insulation to protect from over-spray.
- 37 D. Coordinate installation of the sprayed cellulose fiber with work of other trades.
- 38 E. Prime surfaces as required by manufacturer's instructions or as determined by examination.

39 **3.3 INSTALLATION**

- 40 A. Install spray applied insulation to achieve an average NRC as indicated on the Material Tag Index.
- 41 B. Cure insulation with continuous natural or mechanical ventilation.
- 42 C. Remove and dispose of over-spray.

43 **3.4 PROTECTION**

- 44 A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other
45 causes.

46 **END OF SECTION**

1 **SECTION 07 24 19**

2 **EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)**

3 **PART 1 – GENERAL**

4	1.1	RELATED DOCUMENTS
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7	1.4	PREINSTALLATION MEETINGS
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28	3.7	INSULATION INSTALLATION
29	3.8	BASE-COAT INSTALLATION
30	3.9	FINISH-COAT INSTALLATION
31	3.10	ELASTOMERIC COATING APPLICATION
32	3.11	CLEANING AND PROTECTION

33 **PART 1 - GENERAL**

34 **1.1 RELATED DOCUMENTS**

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

37 **1.2 SUMMARY**

- 38 A. Section Includes:
39 1. EIFS-clad wall assemblies that are field applied over substrate.
40 B. Related Requirements:
41 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
42 2. Section 01 91 00 "Commissioning" for submittal and product requirements.
43 3. Section 07 92 00 "Joint Sealants" for sealing joints in EIFS with elastomeric joint sealants and for
44 perimeter joints between system and other materials.

45 **1.3 DEFINITIONS**

- 46 A. Definitions in ASTM E 2110 apply to Work of this Section.
47 B. EIFS: Exterior insulation and finish system(s).
48 C. IBC: International Building Code.

49 **1.4 PREINSTALLATION MEETINGS**

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

51 **1.5 ACTION SUBMITTALS**

- 52 A. Product Data: For each EIFS component, trim, and accessory.

- 1 1. Test Reports: Submit copies of selected test reports verifying the performance of the system(s).
2 B. LEED Submittals:
3 1. Product Data for Credit IEQ 4.1: For solvent cements and adhesive primers, documentation
4 including printed statement of VOC content.
5 2. Environmental Product Declaration (EPD): Submit copies of the Environmental Product Declaration
6 (EPD) describing the estimated environmental impacts
7 C. Samples for Verification: 24-inch-square panels for each type of finish-coat color and texture indicated,
8 prepared using same tools and techniques intended for actual work including custom trim, each profile.
9 1. Include exposed trim and accessory Samples to verify color selected.
10 2. Include a typical control joint filled with sealant of color selected, as specified in Section 07 92 00
11 "Joint Sealants."

12 **1.6 INFORMATIONAL SUBMITTALS**

- 13 A. Evaluation Reports: For EIFS, including insulation from ICC-ES.
14 B. Sample Warranty: For manufacturer's special warranty.

15 **1.7 CLOSEOUT SUBMITTALS**

- 16 A. Maintenance Data: For EIFS to include in maintenance manuals.

17 **1.8 QUALITY ASSURANCE**

- 18 A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install
19 manufacturer's system using trained workers.
20 B. Mockups: Apply mockups of each coating system (COAT-#) system indicated and each color and finish
21 selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic
22 effects and set quality standards for materials and execution.
23 1. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete
24 a mockup submittal for review.
25 2. Architect will select one surface to represent surfaces and conditions for application of each finish
26 system.
27 a. Existing EIFS Removal and EIFS-1 tie in. Refer to Drawings for size and location.
28 b. EIFS-2 Patch and Repair. Refer to Drawings for size and location.
29 c. Other Items: Architect will designate items or areas required.
30 3. Final approval of color selections will be based on mockups.
31 a. If preliminary color selections are not approved, apply additional mockups of additional
32 colors selected by Architect at no added cost to Owner.
33 4. Approval of mockups does not constitute approval of deviations from the Contract Documents
34 contained in mockups unless Architect specifically approves such deviations in writing.
35 5. Subject to compliance with requirements, approved mockups may become part of the completed
36 Work if undisturbed at time of Substantial Completion.

37 **1.9 DELIVERY, STORAGE, AND HANDLING**

- 38 A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying
39 products.
40 B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface
41 contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.
42 1. Stack insulation board flat and off the ground.
43 2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to
44 Project site before installation time.
45 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of
46 construction.

47 **1.10 FIELD CONDITIONS**

- 48 A. Weather Limitations: Maintain ambient temperatures above 40 deg F for a minimum of 24 hours before,
49 during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during
50 rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient
51 outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to
52 manufacturers' written instructions and warranty requirements.
53

- 1 **1.11 WARRANTY**
- 2 A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of EIFS-clad
- 3 drainage-wall assemblies that fail in materials or workmanship within specified warranty period.
- 4 1. Failures include, but are not limited to, the following:
- 5 a. Bond integrity and weather tightness.
- 6 b. Deterioration of EIFS finishes and other EIFS materials beyond normal weathering.
- 7 2. Warranty coverage includes the following components of EIFS-clad drainage-wall assemblies:
- 8 a. EIFS finish, including base coats, finish coats, and reinforcing mesh.
- 9 b. Insulation installed as part of EIFS.
- 10 c. Insulation adhesive and mechanical fasteners.
- 11 d. EIFS accessories, including trim components and flashing.
- 12 e. Water-resistive coatings.
- 13 f. EIFS drainage components.
- 14 3. Warranty Period: 10 years from date of Substantial Completion.
- 15 B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace
- 16 elastomeric coatings that fail within specified warranty period.
- 17 1. Failures include, but are not limited to, the following:
- 18 a. Water penetration through the coating.
- 19 b. Deterioration of coating beyond normal weathering.
- 20 2. Warranty Period: 10 years from date of Substantial Completion.

21 **PART 2 - PRODUCTS**

22 **2.1 MANUFACTURERS**

- 23 A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 24 1. BASF Corporation.
- 25 2. Dryvit Systems, Inc.
- 26 3. H.B. Fuller Construction Products Inc. / TEC.
- 27 4. Sto Corp.
- 28 5. Total Wall, Inc.
- 29 B. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources
- 30 approved by EIFS manufacturer as compatible with EIFS components.

31 **2.2 PERFORMANCE REQUIREMENTS**

- 32 A. EIFS Performance: Comply with ASTM E 2568 and with the following:
- 33 1. Weather tightness: Resistant to uncontrolled water penetration from exterior, with a means to drain
- 34 water entering EIFS to the exterior.
- 35 2. System Fire Performance: Fire-resistance rating of wall assembly. All components shall have a:
- 36 3. Flame Spread < 25 and Smoke Developed < 450 per ASTM E-84.
- 37 4. Structural Performance: EIFS assembly and components shall comply with ICC-ES AC219 when
- 38 tested according to ASTM E 2568.
- 39 a. Wind Loads: Uniform pressure as indicated on Drawings.
- 40 5. Impact Performance: ASTM E 2568, Standard impact resistance unless otherwise indicated.
- 41 6. Bond Integrity: Free from bond failure within EIFS components or between EIFS and substrates,
- 42 resulting from exposure to fire, wind loads, weather, or other in-service conditions.
- 43 7. Abrasion Resistance of Finish Coat: Sample consisting of 1-inch-thick EIFS mounted on 1/2-inch-
- 44 thick gypsum board; cured for a minimum of 28 days and shows no cracking, checking, or loss of
- 45 film integrity after exposure to 528 quarts of sand when tested according to ASTM D 968, Method
- 46 A.
- 47 8. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean glass substrate; cured for
- 48 28 days and shows no growth when tested according to ASTM D 3273 and evaluated according to
- 49 ASTM D 3274.
- 50

- 1 **2.3 EIFS SYSTEMS**
- 2 A. Drainable system (**EIFS-1**):
- 3 1. Basis of Design: Dryvit Systems, Inc. Outsulation Plus MD.
- 4 2. General: The Dryvit Outsulation Plus MD System shall be an Exterior Insulation and Finish System
- 5 (EIFS), Class PB, consisting of an air/water-resistive barrier, an adhesive, expanded polystyrene
- 6 insulation board, base coat, reinforcing mesh(es) and finish. Field applied.
- 7 a. The system shall be terminated a minimum of 8 inches above finished grade.
- 8 3. Reinforcing Mesh: Panzer Mesh 20 Oz. EIMA "Ultra High". Refer to Drawings for location.
- 9 4. Weather Barrier: Backstop NT-VB Spray
- 10 5. Base Coat: Dryflex
- 11 B. Non-draining system to match the existing (**EIFS-2**):
- 12 1. Basis of Design: Dryvit Systems, Inc. Outsulation System.
- 13 2. General: An Exterior Insulation and Finish System, Class PB, consisting of an adhesive, expanded
- 14 polystyrene insulation board, base coat, reinforcing mesh(es) and finish. Mechanically attached.
- 15 Field applied.
- 16 a. The system shall be terminated a minimum of 8 inches above finished grade.
- 17 3. System: Non-cementitious Base Coat (NCB)
- 18 4. Texture: Freestyle.
- 19 C. Color:
- 20 1. COAT-1A
- 21 2. Style: Demandit Sanded
- 22 3. Application: Spray Or Brush Applied
- 23 4. Color RGB: 208,210,208
- 24 5. Color RAL: 7047;
- 25
- 26 6. COAT-1B
- 27 7. Style: Demandit Sanded
- 28 8. Application: Spray Or Brush Applied
- 29 9. Color RGB:76,78,77
- 30 10. Color RAL: 7043;
- 31 **2.4 EIFS MATERIALS – GENERAL**
- 32 A. Provide a complete Basis of Design system of components required whether specifically described or
- 33 inferred from the general descriptions. Components shall comply with the following requirements.
- 34 B. Primer/Sealer: EIFS manufacturer's standard substrate conditioner designed to protect substrates from
- 35 moisture penetration and to improve the bond between substrate and insulation adhesive; with VOC
- 36 content of 250 g/L or less.
- 37 C. Water-Resistive Coatings: EIFS manufacturer's standard formulation and accessories for use as water-
- 38 resistive barriers; compatible with substrate and complying with physical and performance criteria of ASTM
- 39 E 2570.
- 40 D. Vapor Retarder: Dryvit Backstop NT-VB: A Class 1 vapor retarder, available in trowel and spray versions.
- 41 When specified, consider having a WVT analysis performed.
- 42 E. Flexible-Membrane Flashing: Cold-applied, self-adhering, self-healing, rubberized-asphalt and
- 43 polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product
- 44 recommended in writing by EIFS manufacturer.
- 45 F. Mechanical Fasteners: Shall be Wind-lock's Wind Devil™ plates, or equivalent, used in conjunction with
- 46 corrosion resistant fasteners appropriate for the substrate system.
- 47 G. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; [specifically
- 48 formulated to be applied to back side of insulation in a manner that creates open vertical channels
- 49 designed to serve as an integral part of the water-drainage system of the EIFS-clad drainage-wall
- 50 assembly; compatible with substrate; with VOC content of 50 g/L or less; and complying with the following:
- 51 1. Factory-mixed noncementitious formulation designed for adhesive attachment of insulation to
- 52 substrates of type indicated, as recommended by EIFS manufacturer.
- 53 H. Drainage Mat: Three-dimensional, nonwoven, entangled filament, nylon or plastic or woven or fused, self-
- 54 furring, PVC mesh lath mat designed to drain incidental moisture by gravity; EIFS manufacturer's standard
- 55 or product recommended in writing by EIFS manufacturer with manufacturer's standard corrosion-resistant
- 56 mechanical fasteners suitable for intended substrate.
- 57 I. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with ASTM C 578, Type I; and EIFS
- 58 manufacturer's requirements for most stringent requirements for material performance and qualities of
- 59 insulation, including dimensions and permissible variations, and the following:

- 1 1. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than six
- 2 weeks.
- 3 2. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, according to
- 4 ASTM E 84.
- 5 3. Dimensions: Provide insulation boards of not more than 24 by 48 inches thick or in other thickness
- 6 indicated, but not more than 4 inches thick or less than the thickness allowed by ASTM C 1397.
- 7 4. Channeled Board Insulation: EIFS manufacturer's standard factory-fabricated profile with linear,
- 8 vertical-drainage channels, slots, or waves on the back side of board.
- 9 J. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with
- 10 other EIFS materials, made from continuous multi-end strands with retained mesh tensile strength of not
- 11 less than 120 lbf/inch according to ASTM E 2098 and the following:
- 12 1. Reinforcing Mesh for EIFS, General: Not less than weight required to meet impact-performance
- 13 level specified in "Performance Requirements" Article.
- 14 2. Strip Reinforcing Mesh: As recommended by EIFS manufacturer.
- 15 3. Detail Reinforcing Mesh: As recommended by EIFS manufacturer.
- 16 4. Corner Reinforcing Mesh: As recommended by EIFS manufacturer.
- 17 K. Waterproof Adhesive/Base-Coat Materials: EIFS manufacturer's standard waterproof formulation with
- 18 VOC content of 50 g/L or less and complying with the following:
- 19 1. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and
- 20 manufacturer's standard dry mix containing Portland cement.
- 21 L. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating with enhanced mildew
- 22 resistance complying with the following:
- 23 1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone
- 24 particles, and fillers.
- 25 2. Colors: Match Architect's sample.
- 26 3. Textures: Match Architect's sample.
- 27 M. Water: Potable.
- 28 N. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS
- 29 manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D
- 30 1784, manufacturer's standard cell class for use intended, and ASTM C 1063.
- 31 1. Casing Bead: Prefabricated, one-piece type for attachment behind insulation, of depth required to
- 32 suit thickness of coating and insulation, with face leg perforated for bonding to coating and back
- 33 leg.
- 34 2. Drip Screed/Track: Prefabricated, one-piece type for attachment behind insulation with face leg
- 35 extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg
- 36 perforated for bonding to coating and back leg.
- 37 3. Windowsill Flashing: Prefabricated type for both flashing and sloping sill over framing beneath
- 38 windows; with end and back dams; designed to direct water to exterior.
- 39 O. Mixing:
- 40 1. Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not
- 41 introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix
- 42 materials in clean containers. Use materials within time period specified by EIFS manufacturer or
- 43 discard.

44 2.5 ELASTOMERIC COATING AND RESTORATION

- 45 A. Subject to compliance with requirements and Basis of Design, provide product by one of the following:
- 46 1. Dryvit
- 47 2. Sto Corp.
- 48 3. Textured Coatings of America, Inc.
- 49 B. Basis of Design: Dryvit Systems, Inc. Demandit Sanded (DS400).
- 50 C. Coating - General:
- 51 1. System: 100% acrylic Exterior/Interior Acrylic PMR Architectural Coatings.
- 52 2. Material Characteristics:
- 53 a. Surface Burning (ASTM E 84)
- 54 1) Flame Spread <25.
- 55 2) Smoke Developed <450.
- 56 b. Water Vapor Transmission (ASTM E 96 Procedure B): Vapor Permeable.
- 57 c. Accelerated Weathering:
- 58 1) ASTM G 154 Cycle 1 (QUV): No deleterious effects after 5000 hours.
- 59 2) ASTM G 154 Cycle 1 (Xenon Arc): No deleterious effects after 5000 hours.
- 60 d. Mildew Resistance (ASTM D 3273): No growth 28 day during exposure period.

- 1 3. Weatherlastic Sandpebble® Fine: A 100% acrylic based finish utilizing an elastomeric binder with a
2 fine, pebble like texture.
- 3 4. Weatherlastic Adobe®: A 100% acrylic based finish utilizing an elastomeric binder with a smooth
4 fine sand texture.
- 5 5. Weatherlastic Smooth®: A smooth, nontextured 100% acrylic based coating utilizing an elastomeric
6 binder.
- 7 6. Weathercoat Acrylic Coating: A smooth, nontextured 100% acrylic emulsion based exterior
8 coating.
- 9 7. Weatherprime Acrylic Primer: A pigmented, exterior acrylic primer.
- 10 D. Coating: (COAT-1A):
- 11 1. Color: Refer to Material ID List.
- 12 E. Coating: (COAT-1B):
- 13 1. Color: Refer to Material ID List.
- 14 F. Materials:
- 15 1. Primer/Skim Coat Material: Primus, Primus DM, Genesis, or Genesis DM for skim coating masonry
16 surfaces.

17 **PART 3 - EXECUTION**

18 **3.1 EXAMINATION**

- 19 A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for
20 installation tolerances and other conditions affecting performance of the Work.
- 21 B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for
22 suitable conditions where EIFS will be installed.
- 23 C. Proceed with installation only after unsatisfactory conditions have been corrected.
24 1. Begin coating application only after surfaces are dry.
25 2. Application of coating indicates acceptance of surfaces and conditions.

26 **3.2 PREPARATION**

- 27 A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide
28 temporary covering and other protection needed to prevent spattering of exterior finish coats on other
29 work.
- 30 B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation.
31 Prevent penetration of moisture behind drainage plane of EIFS and deterioration of substrates.
- 32 C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum
33 bond between substrate and adhesive for insulation.

34 **3.3 EIFS INSTALLATION, GENERAL**

- 35 A. Comply with ASTM C 1397, ASTM E 2511, and EIFS manufacturer's written instructions for installation of
36 EIFS as applicable to each type of substrate indicated.

37 **3.4 SUBSTRATE PROTECTION APPLICATION**

- 38 A. Primer/Sealer: Apply over sheathing substrates and where required by EIFS manufacturer for improving
39 adhesion of insulation to substrate.
- 40 B. Water-Resistive Coating: Apply over sheathing to provide a water-resistive barrier.
41 1. Tape and seal joints, exposed edges, terminations, and inside and outside corners of sheathing
42 unless otherwise indicated by EIFS manufacturer's written instructions.
- 43 C. Flexible-Membrane Flashing: Install over weather-resistive barrier, applied and lapped to shed water; seal
44 at openings, penetrations, terminations, and where required by EIFS manufacturer. Prime substrates if
45 required and install flashing to comply with EIFS manufacturer's written instructions and details.

46 **3.5 TRIM INSTALLATION**

- 47 A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints, at windowsills, and elsewhere as
48 indicated. Coordinate with installation of insulation.
49 1. Windowsill Flashing: Use at windows unless otherwise indicated.
50 2. Casing Bead: Use at other locations.
51 3. Drip Screed/Track. Use at terminations as required by manufacturer.

1 **3.6 DRAINAGE MAT INSTALLATION**

- 2 A. Drainage Mat: Apply wrinkle free, continuously, with edges butted and mechanically secured with
3 fasteners over water-resistive barrier.

4 **3.7 INSULATION INSTALLATION**

- 5 A. Board Insulation: Adhesively attach insulation to substrate in compliance with ASTM C 1397 and the
6 following:

- 7 1. Apply adhesive to insulation by notched-trowel method in a manner that results in coating the entire
8 surface of drainage mat with adhesive once insulation is adhered to drainage mat.
9 2. Allow adhered insulation to remain undisturbed for not less than 24 hours, before beginning rasping
10 and sanding insulation or applying base coat and reinforcing mesh.
11 3. Apply insulation over substrates in courses with long edges of boards oriented horizontally.
12 4. Begin first course of insulation from screed/track and work upward. Work from perimeter casing
13 beads toward interior of panels if possible.
14 5. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern.
15 Locate joints so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not
16 less than 6 inches from corners of window and door openings.
17 a. Adhesive Attachment: Offset joints of insulation not less than 6 inches from horizontal and 4
18 inches from vertical joints in sheathing.
19 6. Interlock ends at internal and external corners.
20 7. Abut insulation tightly at joints within and between each course to produce flush, continuously even
21 surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill
22 with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
23 8. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes
24 complying with details indicated.
25 9. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/16
26 inch from surface of insulation and to remove yellowed areas due to sun exposure; do not create
27 depressions deeper than 1/16 inch. Prevent airborne dispersal and immediately collect insulation
28 raspings or sandings.
29 10. Interrupt insulation for expansion joints where indicated.
30 11. Form joints for sealant application with back-to-back casing beads for joints within EIFS and with
31 perimeter casing beads at dissimilar adjoining surfaces. Make gaps between casing beads and
32 between perimeter casing beads and adjoining surfaces of width indicated.
33 12. After installing insulation and before applying field-applied reinforcing mesh, fully wrap board
34 edges. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches over front
35 and back face unless otherwise indicated on Drawings.
36 13. Treat exposed edges of insulation as follows:
37 a. Except for edges forming substrates of sealant joints, encapsulate with base coat,
38 reinforcing mesh, and finish coat.
39 b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and
40 other work with base coat and reinforcing mesh.
41 c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over
42 face leg of accessories.
43 14. Coordinate installation of flashing and insulation to produce wall assembly that does not allow
44 water to penetrate behind flashing and water-resistive barrier.

45 **3.8 BASE-COAT INSTALLATION**

- 46 A. Waterproof Adhesive/Base Coat: To exposed surfaces of insulation, apply in minimum thickness
47 recommended in writing by EIFS manufacturer over window sills and where indicated on Drawings.
48 B. Base Coat: Apply to exposed surfaces of insulation in minimum thickness recommended in writing by EIFS
49 manufacturer, but not less than 1/16-inch dry-coat thickness.
50 C. Reinforcing Mesh: Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh
51 continuous at corners, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with
52 ASTM C 1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches of
53 corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-
54 mesh color and pattern are invisible.
55 D. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings, extending 4 inches beyond
56 perimeter. Apply additional 9-by-12-inch strip reinforcing mesh diagonally at corners of openings (re-entrant
57 corners). Apply 8-inch-wide, strip reinforcing mesh at both inside and outside corners unless base layer of
58 mesh is lapped not less than 4 inches on each side of corners.
59 1. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.

- 1 E. Double Base-Coat Application: Where indicated, apply second base coat in same manner and thickness
2 as first application, except without reinforcing mesh. Do not apply until first base coat has cured.
3 F. Double-Layer Reinforcing-Mesh Application: Where indicated or required, apply second base coat and
4 second layer of reinforcing mesh, overlapped not less than 2-1/2 inches or otherwise treated at joints to
5 comply with ASTM C 1397 and EIFS manufacturer's written instructions in same manner as first
6 application. Do not apply until first base coat has cured.

7 **3.9 FINISH-COAT INSTALLATION**

- 8 A. Finish Coat: Apply over dry base coat, maintaining a wet edge at all times for uniform appearance, in
9 thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching
10 approved sample and free of cold joints, shadow lines, and texture variations.
11 B. Sealer Coat: Apply over dry finish coat, in number of coats and thickness required by EIFS manufacturer.

12 **3.10 ELASTOMERIC COATING APPLICATION**

- 13 A. Surface Preparation:
14 1. Protection: Protect adjacent Work areas and finish surfaces from damage during coating
15 application.
16 2. Prepare surfaces in accordance with manufacturer's instructions.
17 3. Ensure that substrate is sound, clean, dry, and free of dust, dirt, oils, grease, laitance,
18 efflorescence, mildew, fungus, biological residues, and other contaminants that could prevent
19 proper adhesion.
20 4. Masonry: The masonry surface, with joints struck flush, shall be "skim coated" with primer/Skim
21 Coat material to produce a smooth, level surface.
22 B. Mixing:
23 1. Mix coating in accordance with manufacturer's instructions to ensure uniform color and aggregate
24 disbursement and to minimize air entrapment.
25 2. In multi-pail applications, mix contents of each new pail into partially used pail to ensure color
26 consistency and smooth transitions from pail to pail.
27 C. Apply coating in accordance with manufacturer's instructions.
28 1. The finish shall be brush, spray or trowel applied in accordance with specific product instructions.
29 2. Additives shall not be added under any circumstances.
30 3. The finish shall be applied to the entire wall surface in a continuous application to a natural break.
31 4. Finish shall be protected from airborne contamination such as dust, soot, etc. and from weather
32 and other damage until fully dried.

33 **3.11 CLEANING AND PROTECTION**

- 34 A. Remove temporary covering and protection of other work. Promptly remove coating materials from window
35 and door frames and other surfaces outside areas indicated to receive EIFS coatings.

36 **END OF SECTION**

- 1 C. Double-Layer WRB-1 (2-ply): Install a 19-inch- (483-mm-) wide starter course and completely cover with a
2 36-inch- (914-mm-) wide second course. Install succeeding 36-inch- (914-mm-) wide courses lapping
3 previous courses 19 inches (483 mm) in shingle fashion. Lap ends a minimum of 6 inches (152 mm). Stagger
4 end laps between succeeding courses at least 72 inches (1829 mm). Fasten to sheathing with galvanized
5 staples or roofing nails.

6 **END OF SECTION**

SECTION 07 27 15

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NONBITUMINOUS SELF-ADHERING SHEET AIR BARRIERS

PART 1 – GENERAL

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Self-adhering, vapor-retarding, non-bituminous sheet air barriers for sealing above grade walls.
- B. Related Requirements:
 - 1. Section 06 16 00 "Sheathing" for wall sheathings and wall sheathing joint-and-penetration treatments.
 - 2. Section 07 25 00 "Weather Barriers" for building paper used as weather barrier.

1.3 DEFINITIONS

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

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; and tested physical and performance properties of products.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.

- 1 B. Sustainable Design Submittals:
- 2 1. Certificate: MR5.1, MR5.2 - Regional Materials for products manufactured within 500 miles of the
- 3 project location. Third party certified.
- 4 C. Shop Drawings: For air-barrier assemblies.
- 5 1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project
- 6 conditions.
- 7 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside
- 8 corners, terminations, and tie-ins with adjoining construction.
- 9 3. Include details of interfaces with other materials that form part of air barrier.

10 **1.6 INFORMATIONAL SUBMITTALS**

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

17 **1.7 QUALITY ASSURANCE**

- 18 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
- 19 manufacturer.
- 20 1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall
- 21 employ ABAA-certified installers and supervisors on Project.

22 **1.8 DELIVERY, STORAGE, AND HANDLING**

- 23 A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- 24 B. Protect stored materials from direct sunlight.

25 **1.9 FIELD CONDITIONS**

- 26 A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures
- 27 recommended in writing by air-barrier manufacturer.
- 28 1. Protect substrates from environmental conditions that affect air-barrier performance.
- 29 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.
- 30 B. Maximum exposure time of the air barrier assembly without cover or cladding is 12 months.

31 **PART 2 - PRODUCTS**

32 **2.1 MATERIALS**

- 33 A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from
- 34 single manufacturer.
- 35

1 **2.2 PERFORMANCE REQUIREMENTS**

- 2 A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of
3 performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the
4 exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of
5 accommodating substrate movement and of sealing substrate expansion and control joints, construction
6 material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions
7 without deterioration and air leakage exceeding specified limits.
- 8 B. Assembly Performance:
- 9 1. Standards Compliance:
 - 10 a. ASTM E 2357.
 - 11 b. CAN/ULC-S741.
 - 12 c. CAN/ULC-S742.
 - 13 2. Air Leakage: ASTM E2357:
 - 14 a. Opaque Wall: Less than 0.002 cfm/ft² at 1.57 psf (0.01 L/s/m² at 75 Pa).
 - 15 b. Penetrated Wall: Less than 0.006 cfm/ft² at 1.57 psf (0.03 L/s/m² at 75 Pa).
 - 16 3. Loads from imposed pressures: Withstands design wind, fan, and stack pressures, both positive and
17 negative, without damage or displacement of the air barrier assembly or adjacent materials. Allows
18 transfer of these loads to the structure.
 - 19 4. Movement: Allows for thermal, creep, and anticipated seismic and building movement within the air
20 barrier assembly, each air barrier detail, and transitions to adjacent systems without breaching the
21 air barrier system or negating specified air leakage performance.
 - 22 5. Continuity: Joins air barrier materials and adjacent compatible materials and systems preventing air
23 leakage and maintaining specified air leakage performance at the following locations and as shown
24 on the Drawings:
 - 25 a. Transitions from roof air barrier to wall.
 - 26 b. Transitions from window, curtain wall, storefront, louvers, and doors to wall.
 - 27 c. Transitions from foundation waterproofing to wall.
 - 28 d. Transitions from one type of exterior cladding to another.
 - 29 e. Across construction, control, expansion, and seismic joints.
 - 30 f. Penetrations of utilities, pipes, conduit, and ducts.
 - 31 g. Penetrations of ties, anchors, and channels for exterior finishes.
 - 32 h. Pathways for potential air leakage into the building envelope.

33 **2.3 NONBITUMINOUS SHEET AIR BARRIER (WAVB-1)**

- 34 A. Basis-of-Design Product: Subject to compliance with requirements, provide 3M Air and Vapor Barrier 3015,
35 self-adhered, vapor-impermeable or comparable product by one of the following:
 - 36 1. Blueskin SA manufactured by Henry
 - 37 2. Tremco, Inc., ExoAir 110AT.
 - 38 3. Carlisle Coatings & Waterproofing Inc.
- 39 B. Description: Tan colored, semi-transparent proprietary film with acrylic adhesive and silicone coated release
40 liner.
 - 41 1. Manufacturer Location: Knoxville, IA, USA.
 - 42 2. Impermeable to air, water vapor, and water.
 - 43 3. Resists UV exposure for up to 12 months.
 - 44 4. Meets requirements of ASTM E2178 and CAN/ULC S741-8.
 - 45 5. Weight: 13.4 oz/sq.yd. (464 g/sq.m.).
 - 46 6. Total Membrane Thickness (ASTM D3652): 10 mils (0.25 mm).
 - 47 7. Air Permeance: Not to exceed 0.00005 cubic feet per minute per square foot under a pressure
48 differential of 0.3 inch water (1.57 psf) (0.0002 L/sm at 75 Pa) when tested in accordance with ASTM
49 E2178.
 - 50 8. Elongation at Break (ASTM D882): 700 percent.
 - 51 9. Tensile Strength (ASTM D882): 1740 psi (12 MPa).
 - 52 10. Lap Adhesion (ASTM D3330): 40 oz/inch (0.44 N/mm).
 - 53 11. Low Temperature Flexibility (ASTM D1970, Section 7.6): At -22 degrees F (-30 degrees C) passes
54 bend test and no leakage during water head test.
 - 55 12. Nail Sealability:
 - 56 a. ASTM D1970, Section 7.9: 5 inches (127 mm) of water head after 3 days, dry and passes.
 - 57 b. ASTM E331/547, as modified per AAMA-711-07, Annex 1: Passes initial and after thermal
58 cycling.
 - 59 13. Water Vapor Permeance (ASTM E96, Water method): Not to exceed 1 US Perm (57 ng/Pa s m²).
 - 60 14. Water Resistance (AATCC-127): Deviated, 2.16 inches (55 cm) of water for 5 hours; no leakage.
 - 61 15. Service Temperature: -40 to 240 degrees F (-40 to 80 degrees C).

- 1 16. Flammability:
2 a. ASTM E84: Flame spread index less than 15, smoke developed value less than 45. Rating:
3 Class A.
4 b. Membrane in an approved wall assembly meets performance requirements of NFPA 285.

5 **2.4 ACCESSORY MATERIALS**

- 6 A. Requirement: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips,
7 flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives,
8 tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-
9 barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-
10 barrier material and adjacent construction to which they may seal.
11 B. Primer for Difficult Substrates: Test adhesion before application:
12 1. 3M Hi-Strength 90 Spray Adhesive.
13 2. 3M Hi-Strength 94 ET Spray Adhesive.
14 3. 3M Scotch-Weld Holdfast 70.
15 4. 3M Fastbond Contact Adhesive 30NF.
16 C. Flashing Tape: 3M Self-Adhered Air and Vapor Barrier 3015TWF Membrane in detail widths.
17 1. Description: Tan colored, semi-transparent proprietary film with acrylic adhesive and silicone coated
18 release liner.
19 2. Total Thickness (ASTM D3652): 10 mils (0.25 mm).
20 D. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel
21 fasteners.

22 **PART 3 - EXECUTION**

23 **3.1 EXAMINATION**

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

33 **3.2 SURFACE PREPARATION**

- 34 A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's
35 written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
36 B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other
37 construction.
38 C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating
39 contaminants or film-forming coatings from concrete.
40 D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other
41 voids in concrete with substrate-patching membrane.
42 E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
43 F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to
44 form a smooth transition from one plane to another.
45 G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with
46 stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
47 H. Bridge isolation joints, expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints
48 with air-barrier accessory material that accommodates joint movement according to manufacturer's written
49 instructions and details.

50 **3.3 INSTALLATION**

- 51 A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with
52 adjacent construction and ensure continuity of air and water barrier.
53 1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required
54 rate and allow it to dry.

- 1 B. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and
2 penetrations with termination mastic.
- 3 C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by
4 air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.
- 5 D. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and
6 maintain uniform 2-inches minimum lap widths and end laps. Overlap and seal seams, and stagger end laps
7 to ensure airtight installation.
- 8 1. Apply sheets in a shingled manner to shed water.
- 9 2. Roll sheets firmly to enhance adhesion to substrate.
- 10 E. Apply continuous air-barrier sheets over accessory strips bridging substrate cracks, construction, and
11 contraction joints.
- 12 F. CMU: Install air-barrier sheet horizontally against the CMU beginning at base of wall. Align top edge of air-
13 barrier sheet immediately below protruding masonry ties or joint reinforcement or ties, and firmly adhere in
14 place.
- 15 1. Overlap horizontally adjacent sheets a minimum of 2 inches and roll seams.
- 16 2. Apply overlapping sheets with bottom edge slit to fit around masonry reinforcing or ties. Roll firmly
17 into place.
- 18 3. Seal around masonry reinforcing or ties and penetrations with termination mastic.
- 19 4. Continue the sheet into all openings in the wall, such as doors and windows, and terminate at points
20 to maintain an airtight barrier that is not visible from interior.
- 21 G. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch-wide, transition strip.
- 22 H. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal
23 counterflashings or ending in reglets with termination mastic.
- 24 I. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a
25 continuous air barrier.
- 26 1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure
27 continuity of air barrier with roofing membrane.
- 28 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of
29 coverage is achieved over each substrate.
- 30 J. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete
31 below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall
32 systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior
33 wall openings, using accessory materials.
- 34 K. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.
- 35 L. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application
36 temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- 37 M. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors.
38 Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain
39 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
- 40 1. Transition Strip: Roll firmly to enhance adhesion.
- 41 N. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous
42 penetrations of air-barrier material with foam sealant.
- 43 O. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters.
44 Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.
- 45 P. Do not cover air barrier until it has been tested and inspected by testing agency.
- 46 Q. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and
47 reapply air-barrier components.

48 **3.4 CLEANING AND PROTECTION**

- 49 A. Protect air-barrier system from damage during application and remainder of construction period, according
50 to manufacturer's written instructions.
- 51 1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in
52 writing by manufacturer. If exposed to these conditions for longer than recommended, remove and
53 replace air barrier or install additional, full-thickness, air-barrier application after repairing and
54 preparing the overexposed materials according to air-barrier manufacturer's written instructions.
- 55 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier
56 manufacturer.
- 57 B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using
58 cleaning agents and procedures recommended in writing by manufacturer of affected construction.

59 **END OF SECTION**

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SECTION 07 41 13.13

FORMED METAL ROOF PANELS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exposed-fastener, lap-seam, metal roof panels.
- B. Related Sections:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
- C. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

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

1.9 FIELD CONDITIONS

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

1.10 COORDINATION

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

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 75 percent.
- B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.

3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E1646 or ASTM E331 at the following test-pressure difference:
 1. Test-Pressure Difference: 2.86 lbf/sq. ft..
- D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
 1. Uplift Rating: UL 90.
- 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, ambient; 180 deg F, material surfaces.

2.2 EXPOSED-FASTENER, LAP-SEAM, METAL ROOF PANELS

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.
- B. Corrugated-Profile, Exposed-Fastener Metal Roof Panels (**MTLPNL-3**): Formed with alternating curved ribs spaced at 2.67 inches o.c. across width of panel.
 1. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Nominal Thickness: 0.034 inch (22 gage).
 - b. Exterior Finish: Siliconized polyester.
 - c. Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- E. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- F. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
 - 1. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.
 - 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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 METAL PANEL INSTALLATION

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air or water-resistive barriers and flashings that are concealed by metal panels are installed.
 2. Locate and space fastenings in uniform vertical and horizontal alignment.
 3. Install flashing and trim as metal panel work proceeds.
 4. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 5. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 2. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 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. Flash and seal panels with weather closures at perimeter of all openings.
- E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.
- F. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.3 ERECTION TOLERANCES

- A. Installation Tolerances: Per MCA's "Guide Specification for Residential Metal Roofing."

3.4 CLEANING AND PROTECTION

- A. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

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SECTION 07 53 23

2

ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

3

PART 1 – GENERAL

4

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33

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34

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35

PART 1 - GENERAL

36

1.1 RELATED DOCUMENTS

37

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

38

39

1.2 SUMMARY

40

- A. Section Includes:

41

1. Roof system application at plaza pavers on pedestals system on composite concrete/metal deck substrate.

42

2. Roof system application at PV system and rack on metal deck substrate.

43

3. Adhered ethylene-propylene-diene-monomer (EPDM) roofing system (**ROOF-1**).

44

4. Cover board

45

5. Roof insulation.

46

6. Thermal barrier.

47

7. Vapor Barrier.

48

- B. Related Requirements:

49

1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

50

2. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.

51

3. Section 070150.19 "Preparation for Reroofing" for protection of and repair of warranted existing roofing.

52

53

- 1 4. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
- 2 5. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
- 3 6. Section 22 14 23 "Storm Drainage Piping Specialties" for roof drains.
- 4 7. Section 26 31 00 "Photovoltaic System Performance Requirements" for PV racking system.

5 **1.3 DEFINITIONS**

- 6 A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and
- 7 Waterproofing Manual" apply to work of this Section.
- 8 B. Sheet Metal Terminology and Techniques: SMACNA Architectural Sheet Metal Manual.

9 **1.4 SYSTEM DESCRIPTION (ROOF-1)**

- 10 A. Basis of Design: Roof system over steel structural deck is composed of two layers of Firestone ISO 95+ GL
- 11 fully adhered insulation over thermal barrier installed as an air barrier, one layer of Firestone ISOGARD HD
- 12 cover board, Firestone fully adhered 90-mil RubberGard Platinum EPDM. 30-year Firestone Platinum
- 13 Warranty provided.
- 14 B. Basis of Design: Roof system for work required and repair of existing warranted roof. Refer to Section
- 15 070150.19 - Preparation for Reroofing.
- 16 1. PV panels on racking system anchored to existing roof assembly where scheduled.

17 **1.5 PREINSTALLATION MEETINGS**

- 18 A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.
- 19 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency
- 20 representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and
- 21 installers whose work interfaces with or affects roofing, including installers of roof accessories and
- 22 roof-mounted equipment.
- 23 2. Review methods and procedures related to roofing installation, including manufacturer's written
- 24 instructions.
- 25 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel,
- 26 equipment, and facilities needed to make progress and avoid delays.
- 27 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness
- 28 and fastening.
- 29 5. Review structural loading limitations of roof deck during and after roofing.
- 30 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs,
- 31 and condition of other construction that affects roofing system.
- 32 7. Review governing regulations and requirements for insurance and certificates if applicable.
- 33 8. Review temporary protection requirements for roofing system during and after installation.
- 34 9. Review roof observation and repair procedures after roofing installation.
- 35 B. Preinstallation Roofing Conference: Conduct conference at Project site.
- 36 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency
- 37 representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and
- 38 installers whose work interfaces with or affects roofing, including installers of roof accessories and
- 39 roof-mounted equipment.
- 40 2. Review methods and procedures related to roofing installation, including manufacturer's written
- 41 instructions.
- 42 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel,
- 43 equipment, and facilities needed to make progress and avoid delays.
- 44 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness
- 45 and fastening.
- 46 5. Review structural loading limitations of roof deck during and after roofing.
- 47 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs,
- 48 and condition of other construction that affects roofing system.
- 49 7. Review governing regulations and requirements for insurance and certificates if applicable.
- 50 8. Review temporary protection requirements for roofing system during and after installation.
- 51 9. Review roof observation and repair procedures after roofing installation.
- 52

- 1 **1.6 ACTION SUBMITTALS**
2 A. Product Data: For each type of product.
3 B. LEED Submittals:
4 1. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system,
5 documentation including printed statement of VOC content.
6 2. Building Life-Cycle Impact Reduction Statement for insulation and membrane.
7 3. Building Product Disclosures – EPDs 3rd party statement for insulation and membrane..
8 C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other
9 work, including:
10 1. Base flashings and membrane terminations.
11 2. Roof plan showing orientation of steel roof deck and orientation of roofing and fastening spacings
12 and patterns for mechanically fastened roofing.
13 3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

- 14 **1.7 INFORMATIONAL SUBMITTALS**
15 A. Qualification Data: For Installer and manufacturer.
16 B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with
17 requirements specified in "Performance Requirements" Article.
18 1. Submit evidence of complying with performance requirements.
19 C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed
20 by a qualified testing agency.
21 D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
22 E. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed
23 by a qualified testing agency.
24 F. Field quality-control reports.
25 G. Sample Warranties: For manufacturer's special warranties.

- 26 **1.8 CLOSEOUT SUBMITTALS**
27 A. Maintenance Data: For roofing system to include in maintenance manuals.

- 28 **1.9 QUALITY ASSURANCE**
29 A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that
30 used for this Project.
31 B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system
32 manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

- 33 **1.10 DELIVERY, STORAGE, AND HANDLING**
34 A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with
35 manufacturer's name, product brand name and type, date of manufacture, approval or listing agency
36 markings, and directions for storing and mixing with other components.
37 B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within
38 the temperature range required by roofing system manufacturer. Protect stored liquid material from direct
39 sunlight.
40 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
41 C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling,
42 and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for
43 handling, storing, and protecting during installation.
44 D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

- 45 **1.11 FIELD CONDITIONS**
46 A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit
47 roofing system to be installed according to manufacturer's written instructions and warranty requirements.
48

1 **1.12 WARRANTY**

- 2 A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in
3 materials or workmanship within specified warranty period.
4 1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards,
5 roofing accessories, and other components of roofing system.
6 2. Warranty shall cover damage to roof membrane by installation of approved plaza deck and PV array
7 components.
8 3. Warranty Period: 30 years NDL from date of Substantial Completion.

9 **PART 2 - PRODUCTS**

10 **2.1 MANUFACTURERS**

- 11 A. Source Limitations: Obtain components including roof insulation fasteners for roofing system from same
12 manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.
13 B. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building Products or
14 comparable product by one of the following:
15 1. Carlisle Golden Seal Total Roofing System as manufactured by Carlisle Syntec Systems.
16 2. Others as approved equals by Architect prior to Bid Solicitation.

17 **2.2 PERFORMANCE REQUIREMENTS (ROOF-1)**

- 18 A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures,
19 thermally induced movement, and exposure to weather without failure due to defective manufacture,
20 fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
21 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested
22 according to ASTM G 152, ASTM G 154, or ASTM G 155.
23 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D
24 3746 or ASTM D 4272.
25 B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under
26 conditions of service and application required, as demonstrated by roofing manufacturer based on testing
27 and field experience.
28 C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures:
29 1. Corner Uplift Pressure: 120 lbf/sq. ft.
30 2. Perimeter Uplift Pressure: 90 lbf/sq. ft.
31 3. Field-of-Roof Uplift Pressure: 60 lbf/sq. ft.
32 D. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified
33 Product List" for low-slope roof products.
34 E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated;
35 testing by a qualified testing agency. Identify products with appropriate markings of applicable testing
36 agency.
37

- 1 **2.3 EPDM ROOFING (EPDM-1)**
 2 A. EPDM: ASTM D 4637, Type I, nonreinforced, uniform, flexible EPDM sheet.
 3 1. Thickness: 90 mils, nominal.
 4 2. Exposed Face Color: Black.

Physical Properties:	ASTM Standard	Units	Performance Minimum	Typical Values 90 mil
<i>Tensile Strength, minimum</i>	D 412 (Die C) D 826 (Modified)	Psi (MPa) Lbf/in (kN/m)	1305 (9.0) 51 (9)	1425 (9.8)
<i>Factory Seam Strength, minimum</i>	D 412 (Die C) D 624 (Die C)	---	Sheet Failure 300%	Sheet Failure 450%
<i>Elongation, minimum</i>	D 2240	%	150 (26.3)	200 (35.0)
<i>Tear Resistance, minimum</i>	D 1149	Lbf/in (kN/m)	65 ± 10	62
<i>Shore A Durometer</i>	---	---	No Cracks	No Cracks
<i>Ozone Resistance</i>	D 573			
<i>7 days/100 pphm @ 100 °F (37.8 °C) with 50% extension</i>	D 412 (Die C) D 412 (Die C)	Psi (MPa) %	1205 (8.3) 200%	1415 (9.7) 290%
<i>Heat Aging</i>	D 412 (Die C) D 624 (Die C)	Lbf/in (kN/m)	125 (21.9)	180 (31.5)
<i>28 days at 240 °F (116 °C)</i>	D 1204	---	±1.0	<1.0
<i>Tensile Strength Elongation</i>	D 2137	°F(°C) ±	-49 (-45) +8, -2	-63 (-53) +1.73
<i>Tear Resistance Linear Dimensional Change, maximum, %</i>	D 471	±	2.0	+1.93
<i>Brittleness Temperature</i>	E 96	±	±10	±10
<i>Water Resistance Change in Weight after Immersion 7 days @ 150 °F (65.6 °C), %</i>	D 412			

- 5 B. Recycling:
 6 1. Contractor shall divert all of the following materials from disposal at the landfill
 7 a. Metals including edge metal, copings, counter flashings, expansion /control joint covers, and
 8 all non-contaminated metal pails.
 9 b. Plastics, including packaging materials, pails, and containers
 10 c. Cardboard, including packaging materials and roll cores
 11 d. Wood, including demolished nailers, demolished plywood, demolished wood plank decking,
 12 damaged pallets, and new wood or plywood scrap and pieces
 13 2. Contractor shall package the debris as required by the recycler
 14 3. Contractor shall transport the debris to approved recyclers.
 15 4. Pallets in a condition to be reused shall not be land filled.
 16 5. Metal or plastic pails and containers that are contaminated with adhesive, mastic, coatings, and
 17 similar materials are excluded.
 18

1 **2.4 AUXILIARY ROOFING MATERIALS**

- 2 A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible
3 with roofing.
4 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
5 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the
6 following limits for VOC content:
7 a. Plastic Foam Adhesives: 50 g/L.
8 b. Single-Ply Roof Membrane Adhesives: 250 g/L.
9 c. Single-Ply Roof Membrane Sealants: 450 g/L.
10 d. Nonmembrane Roof Sealants: 300 g/L.
11 e. Sealant Primers for Nonporous Substrates: 250 g/L.
12 f. Sealant Primers for Porous Substrates: 775 g/L.
13 g. Other Adhesives and Sealants: 250 g/L.
14 B. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, according to application.
15 C. Protection Sheet: Epichlorohydrin or neoprene nonreinforced flexible sheet, 55- to 60-mil- thick,
16 recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and
17 oil.
18 D. Bonding Adhesive: Manufacturer's standard, water based.
19 E. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 5-inch-wide minimum,
20 butyl splice tape with release film.
21 F. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
22 G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately
23 1 by 1/8 inch thick; with anchors.
24 H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet,
25 approximately 1 inch wide by 0.05 inch thick, pre-punched.
26 I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance
27 provisions in FM Global 4470, designed for fastening membrane to substrate, and acceptable to roofing
28 system manufacturer.
29 J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded
30 pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement
31 strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
32 K. PV Racking Roof Anchor:
33 1. Product: U-Anchor 2000 Single Ply as manufactured by Anchor products:
34 2. Description: An integrated solution for fully adhered single ply membrane applications, consisting of
35 an encapsulated U-Anchor plate with a 3/8 inch-16 S.S. fused to a 16 inches X16 inches membrane
36 target. The target is welded to a fully adhered roof membrane. The Target shall be made from the
37 same brand as the roofing material. Provide color to match roof membrane.

38 **2.5 ROOF INSULATION (INSUL-4)**

- 39 A. General: Preformed roof insulation boards manufactured or approved by EPDM roofing manufacturer,
40 selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
41 B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on
42 both major surfaces.
43 1. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building
44 Products Firestone ISO 95+ GL with fiberglass facer for fully adhered assembly or comparable
45 product.
46 C. Polyisocyanurate Cover Board: ASTM C 1289, Type II, Class 1, Grade 3.
47 1. Basis-of-Design Product: Subject to compliance with requirements, provide Firestone Building
48 Products ISOGARD HD or comparable product.
49 D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for
50 sloping to drain. Fabricate to slopes indicated.
51

- 1 **2.6 SUBSTRATE BOARD (THERMAL BARRIER AT STEEL DECK) (SHTG-1)**
2 A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or
3 ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
4 1. Thickness: 1/2 inch (13 mm).
5 2. Surface Finish: Factory primed.
6 3. Products: Subject to compliance with requirements, provide one of the following:
7 a. CertainTeed Corporation; GlasRoc Sheathing Type X.
8 b. Georgia-Pacific Corporation; Dens Deck DuraGuard.
9 c. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
10 d. USG Corporation; Securock Glass Mat Roof Board.
11 B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance
12 provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.
13 C. Sealant and Flashing Tape: Installation accessories to provide a continuous plane of air/vapor barrier.
14 D. Air Barrier Accessories: Tape, sealants and coated fabric to establish an air barrier at the top surface of the
15 thermal barrier which is continuous with building AVB system.

- 16 **2.8 INSULATION ACCESSORIES**
17 A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and
18 compatibility with roofing.
19 B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance
20 provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing
21 system manufacturer.
22 C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation
23 and cover board to another insulation layer as follows:
24 1. Full-spread spray-applied, low-rise, two-component urethane adhesive.
25 D. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and
26 resistant to UV degradation, type and weight as recommended by roofing system manufacturer for
27 application.

28 **PART 3 - EXECUTION**

- 29 **3.1 EXAMINATION**
30 A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and
31 other conditions affecting performance of the Work:
32 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain
33 bodies are securely clamped in place.
34 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and
35 terminations and that nailers match thicknesses of insulation.
36 B. Proceed with installation only after unsatisfactory conditions have been corrected.
37 C. Steel Roof Deck:
38 1. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in
39 Section 053123 "Steel Roof Decking".
40 E. Proceed with installation only after unsatisfactory conditions have been corrected.

- 41 **3.2 PREPARATION**
42 A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according
43 to roofing system manufacturer's written instructions. Remove sharp projections.
44 B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto
45 surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is
46 forecast.

- 47 **3.3 ROOFING INSTALLATION, GENERAL**
48 A. Install roofing system according to roofing system manufacturer's written instructions.
49 B. Complete terminations and base flashings and provide temporary seals to prevent water from entering
50 completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard
51 temporary seals before beginning work on adjoining roofing.

- 1 **3.4 SUBSTRATE BOARD INSTALLATION (STEEL DECK)**
2 A. Install underlayment board with long joints in continuous straight lines, with end joints staggered not less
3 than 24 inches (610 mm) in adjacent rows.
4 1. At steel roof decks, install underlayment board at right angle to flutes of deck.
5 a. Locate end joints over crests of steel roof deck.
6 2. Tightly butt substrate boards together.
7 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting
8 sloping roof decks.
9 4. Fasten substrate board to top flanges of steel deck according to recommendations in FM Global's
10 "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance
11 Classification.
12 5. Continuously seal side and end joints with tape.
13 6. Completely seal substrate boards at terminations, obstructions, and penetrations to prevent air and
14 moisture vapor movement into roofing system.
15 B. Air Barrier: Install thermal barrier with tape, sealants and coated fabric to establish an air barrier at the top
16 surface for the thermal barrier continuous with building AVB system.

- 17 **3.6 INSULATION INSTALLATION**
18 A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed
19 at the end of the workday.
20 B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
21 C. Install tapered insulation under area of roofing to conform to slopes indicated.
22 D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is
23 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of
24 previous layer a minimum of 6 inches in each direction.
25 E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict
26 flow of water.
27 F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between
28 rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
29 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
30 G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered
31 between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover
32 boards together adhere to insulation.
33 1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
34 2. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and
35 maintaining insulation in place.
36 3. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing
37 and maintaining insulation in place.

- 38 **3.7 ADHERED MEMBRANE ROOFING INSTALLATION**
39 A. Adhere roofing over area to receive roofing according to membrane roofing system manufacturer's written
40 instructions. Unroll membrane roofing and allow to relax before installing.
41 B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
42 C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by
43 manufacturer. Stagger end laps.
44 D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow
45 to partially dry before installing roofing. Do not apply to splice area of roofing.
46 E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeters.
47 F. Apply roofing with side laps shingled with slope of roof deck where possible.
48 G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side
49 and end laps of overlapping roofing according to manufacturer's written instructions to ensure a watertight
50 seam installation. Apply lap sealant and seal exposed edges of roofing terminations.
51 1. Basis of Design: 3 inches QuickSeam™ Splice Tape and 5 inches QuickSeam Flashing OR 6 inches
52 QuickSeam Splice Tape in side and end laps. QuickSeam Joint Covers are required at all joints and
53 at angle changes 1:12 or greater.
54 H. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
55 I. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal membrane roofing in
56 place with clamping ring.

1 **3.8 BASE FLASHING INSTALLATION**

- 2 A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing
3 system manufacturer's written instructions.
- 4 B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially
5 dry. Do not apply to seam area of flashing.
- 6 C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- 7 D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure
8 a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- 9 E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
- 10 F. PV Rack Anchor Installation:
- 11 1. Prepare the roof surface by removing all loose debris and clean the area in accordance with the
12 roofing manufacture recommendations
- 13 2. Apply an approved Seam Slice Adhesive Primer to the roof membrane where the Double Sided Die
14 Cut Adhesive will be placed and allow to dry before continuing.
- 15 3. Peel back half of the release liner exposing the adhesive.
- 16 4. Carefully align the Double Side Die Cut Adhesive and place into the desired position. Do not stretch
17 or pull the adhesive.
- 18 5. Apply an approved Seam Slice Adhesive Primer to the underside of the U-Anchor 2400 Single Ply
19 cover and allow to dry before continuing.
- 20 6. Remove the top release liner and place into position.
- 21 7. Center and place the U-Anchor 2000 over the Double Sided Die Cut Adhesive avoiding wrinkles.
- 22 8. Using a weighted membrane roller firmly roll the entire surface of the U-Anchor membrane cover to
23 ensure a proper bond is achieved.
- 24 9. Firmly roll the perimeter edge to embed the perimeter edge of the membrane in the adhesive. If you
25 are unable to embed the edge of the membrane into the adhesive cut edge sealant may be needed
26 to prevent the membrane reinforcement from wicking moisture.

27 **3.9 FIELD QUALITY CONTROL**

- 28 A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation,
29 membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- 30 B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing
31 installation on completion.
- 32 C. Repair or remove and replace components of roofing system where inspections indicate that they do not
33 comply with specified requirements.
- 34 D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or
35 additional work complies with specified requirements.

36 **3.10 PROTECTING AND CLEANING**

- 37 A. Protect membrane roofing system from damage and wear during remainder of construction period. When
38 remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage,
39 describing its nature and extent in a written report, with copies to Architect and Owner.
- 40 B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair
41 substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration
42 at time of Substantial Completion and according to warranty requirements.

43 **END OF SECTION**

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SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

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26 **PART 1 - GENERAL**

27 **1.1 RELATED DOCUMENTS**

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

30 **1.2 SUMMARY**

- 31 A. Section Includes:
32 1. Formed wall sheet metal flashing fabrications.
33 2. Formed low slope roofing counter flashing fabrications.
34 3. Integral gutters at roof edge.
35 B. Related Work:
36 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
37 2. Section 04 22 00 - Concrete Unit Masonry.
38 3. Section 07 71 00 - Roof Specialties: for copings, roof edge drainage and reglets.

39 **1.3 PREINSTALLATION MEETINGS**

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

41 **1.4 ACTION SUBMITTALS**

- 42 A. Product Data: For each type of product.
43 B. Sustainable Design Submittals:
44 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and
45 cost.
46 C. Shop Drawings: For sheet metal flashing and trim.
47 1. Include plans, elevations, sections, and attachment details.
48 2. Distinguish between shop- and field-assembled work.
49 3. Include identification of finish for each item.
50 4. Include pattern of seams and details of termination points, expansion joints and expansion-joint
51 covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.
52 D. Samples: For each exposed product and for each color and texture specified.

1 **1.5 INFORMATIONAL SUBMITTALS**

- 2 A. Product certificates.
- 3 B. Product test reports.
- 4 C. Sample warranty.

5 **1.6 CLOSEOUT SUBMITTALS**

- 6 A. Maintenance data.

7 **1.7 QUALITY ASSURANCE**

- 8 A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar
- 9 to that required for this Project and whose products have a record of successful in-service performance.

10 **1.8 WARRANTY**

- 11 A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim
- 12 that shows evidence of deterioration of factory-applied finishes within specified warranty period.
- 13 1. Finish Warranty Period: 20 years from date of Substantial Completion.

14 **PART 2 - PRODUCTS**

15 **2.1 PERFORMANCE REQUIREMENTS**

- 16 A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement,
- 17 thermally induced movement, and exposure to weather without failure due to defective manufacture,
- 18 fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not
- 19 rattle, leak, or loosen, and shall remain watertight.
- 20 B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual"
- 21 requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- 22 C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less
- 23 than 25 percent.
- 24 D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
- 25 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

26 **2.2 SHEET METALS**

- 27 A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable,
- 28 temporary protective film before shipping.
- 29 B. Zinc-Tin Alloy-Coated Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead-soft, fully annealed,
- 30 stainless-steel sheet of minimum uncoated thickness indicated; coated on both sides with zinc-tin alloy (50
- 31 percent zinc, 50 percent tin), with factory-applied gray preweathering.
- 32 C. Aluminum Sheet (**FLASH-1**): ASTM B 209, alloy as standard with manufacturer for finish required, with
- 33 temper as required to suit forming operations and performance required.
- 34 1. Alclad Finish: Metallurgically bonded surfacing alloy on both sides, forming aluminum sheet with
- 35 reflective luster.
- 36 D. Metallic-Coated Steel Sheet (**FLASH-2#**): Provide zinc-coated (galvanized) steel sheet according to
- 37 ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to
- 38 ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to
- 39 comply with ASTM A 755/A 755M.
- 40 1. Exposed Finish:
- 41 a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70
- 42 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed
- 43 metal surfaces to comply with coating and resin manufacturers' written instructions.
- 44 2. Color: As selected by Architect from manufacturer's full range.
- 45 3. Refer to Materials List for type and application.
- 46 **4. FLASH 2A:**
- 47 a. Gage: 18
- 48 b. Color: Match EIFS-1
- 49 **5. FLASH 2B: Pre-painted Sheet**
- 50 a. Gage at Water Table: 18 gage.
- 51 b. Gage at Window Heads and Sills: 24 gage.
- 52 c. Color: Match CWALL-1 Frame

1 **2.3 UNDERLAYMENT MATERIALS**

- 2 A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene-
3 or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with
4 release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing.
5 Provide primer according to written recommendations of underlayment manufacturer.
6 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
7 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.
8 B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

9 **2.4 MISCELLANEOUS MATERIALS**

- 10 A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other
11 miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended
12 by manufacturer of primary sheet metal[**or manufactured item**] unless otherwise indicated.
13 B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other
14 suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet
15 metal.
16 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
17 a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied
18 coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed
19 fasteners bearing on weather side of metal.
20 b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being
21 fastened.
22 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
23 3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
24 4. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized
25 steel according to ASTM A 153/A 153M or ASTM F 2329.
26 C. Solder:
27 1. For base materials a mixture of tin and lead [with maximum lead content of 0.2 percent.
28 D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-
29 paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch
30 thick.
31 E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use
32 classifications required to seal joints in sheet metal flashing and trim and remain watertight.
33 F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by
34 aluminum manufacturer for exterior nonmoving joints, including riveted joints.
35 G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
36 H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

37 **2.5 FABRICATION, GENERAL**

- 38 A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations
39 in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other
40 characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
41 1. Obtain field measurements for accurate fit before shop fabrication.
42 2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool
43 marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
44 3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces
45 exposed to view.
46 B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
47 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl
48 sealant concealed within joints.
49 2. Use lapped expansion joints only where indicated on Drawings.
50 C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper
51 installation of elastomeric sealant according to cited sheet metal standard.
52 D. Fabricate cleats and attachment devices from same material as accessory being anchored or from
53 compatible, noncorrosive metal.
54 E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for
55 application, but not less than thickness of metal being secured.
56 F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

57 **2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS**

- 58 A. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
59 1. Zinc-Tin Alloy-Coated Stainless-Steel Sheet.

- 1 B. Counterflashing : Fabricate from the following materials:
- 2 1. Aluminum: 0.032 inch thick.
- 3 C. Roof-Penetration Flashing: Fabricate from the following materials:
- 4 1. Galvanized Steel: 0.028 inch thick.
- 5 D. Roof-Drain Flashing: Fabricate from the following materials:
- 6 1. Stainless Steel: 0.016 inch thick.

7 2.7 WALL SHEET METAL FABRICATIONS

- 8 A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-
- 9 long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings
- 10 to extend 6 inches beyond each side of wall openings; and form with 2-inch-high, end dams. Fabricate from
- 11 the following materials:
- 12 1. Stainless Steel: 0.016 inch thick.
- 13 B. Opening Flashings in Frame Construction: Fabricate head, sill and similar flashings to extend 4 inches
- 14 beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following
- 15 materials:
- 16 1. Stainless Steel: 0.016 inch thick.

17 PART 3 - EXECUTION

18 3.1 UNDERLAYMENT INSTALLATION

- 19 A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical
- 20 fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of
- 21 not less than 2 inches.
- 22 B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate
- 23 if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment
- 24 manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle
- 25 fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap
- 26 side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

27 3.2 INSTALLATION, GENERAL

- 28 A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with
- 29 provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators,
- 30 sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
- 31 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with
- 32 minimum exposure of solder, welds, and sealant.
- 33 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify
- 34 shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- 35 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs
- 36 over fasteners.
- 37 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool
- 38 marks.
- 39 5. Torch cutting of sheet metal flashing and trim is not permitted.
- 40 B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated
- 41 wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces
- 42 with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or
- 43 cited sheet metal standard.
- 44 1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with
- 45 bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
- 46 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood
- 47 substrates, install underlayment and cover with slip sheet.
- 48 C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints
- 49 at maximum of 10 feet with no joints within 24 inches of corner or intersection.
- 50 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant
- 51 concealed within joints.
- 52 2. Use lapped expansion joints only where indicated on Drawings.
- 53 D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails
- 54 and not less than 3/4 inch for wood screws.
- 55 E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize
- 56 possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

- 1 F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with
2 requirements in Section 07 92 00 "Joint Sealants."
3 G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets
4 with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in
5 completed Work.
6 1. Do not solder aluminum sheet.
7 2. Do not use torches for soldering.
8 3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove
9 flux and spatter from exposed surfaces.
10 4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid
11 flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder
12 manufacturer's recommended methods for cleaning and neutralization.
13 5. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.
14 H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

15 **3.3 ROOF FLASHING INSTALLATION**

- 16 A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet
17 metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
18 Install work with laps, joints, and seams that are permanently watertight and weather resistant.
19 B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for
20 elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band
21 and tighten.
22 C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert
23 counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over
24 base flashing. Lap counterflashing joints minimum of 4 inches.
25 D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and
26 other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

27 **3.4 WALL FLASHING INSTALLATION**

- 28 A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited
29 sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of
30 wall-opening components such as windows, doors, and louvers.
31 B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 04 22 00 "Concrete Unit
32 Masonry."

33 **3.5 CLEANING AND PROTECTION**

- 34 A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
35 B. Clean and neutralize flux materials. Clean off excess solder.
36 C. Clean off excess sealants.
37 D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed
38 unless otherwise indicated in manufacturer's written installation instructions.

39 **END OF SECTION**

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SECTION 07 64 19

FLAT-LOCK METAL PANEL SYSTEM

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes flat-lock metal wall panels.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, metal panel Installer, metal panel manufacturer's representative, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
 - 2. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 - 3. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 4. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
 - 5. Review procedures for repair of metal panels damaged after installation.
 - 6. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
 - 2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

- 1 B. Sustainability:
- 2 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
- 3 and cost.
- 4 C. Shop Drawings:
- 5 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel
- 6 profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and
- 7 special details.
- 8 2. Accessories: Include details of the flashing, trim, and anchorage, at a scale of not less than 1-1/2
- 9 inches per 12 inches.
- 10 D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated
- 11 below.
- 12 1. Metal Panels: Full panel. Include fasteners, closures, and other metal panel accessories.

13 **1.5 INFORMATIONAL SUBMITTALS**

- 14 A. Qualification Data: For Installer.
- 15 B. Product Test Reports: For each product, tests performed by a qualified testing agency.
- 16 C. Field quality-control reports.
- 17 D. Sample Warranties: For special warranties.

18 **1.6 CLOSEOUT SUBMITTALS**

- 19 A. Maintenance Data: For metal panels to include in maintenance manuals.

20 **1.7 QUALITY ASSURANCE**

- 21 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
- 22 manufacturer.
- 23 B. Engineering Qualifications: Provide engineering calculations for the metal panel assembly to be prepared
- 24 by an engineer registered in the state the project is located.

25 **1.8 DELIVERY, STORAGE, AND HANDLING**

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

34 **1.9 FIELD CONDITIONS**

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

38 **1.10 COORDINATION**

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

41 **1.11 WARRANTY**

- 42 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace
- 43 components of metal panel systems that fail in materials or workmanship within specified warranty period.
- 44 1. Failures include, but are not limited to, the following:
- 45 a. Structural failures including rupturing, cracking, or puncturing.
- 46 b. Deterioration of metals and other materials beyond normal weathering.
- 47 2. Warranty Period: Two years from date of Substantial Completion.
- 48

1 **PART 2 - PRODUCTS**

2 **2.1 MANUFACTURERS**

- 3 A. Basis-of-Design Product: Subject to compliance with requirements, provide Quality Metalcrafts,
4 LLC/AMERICLAD AC-5000 Flat-Lock Panel System or comparable product by one of the following:
5 1. Protean.
6 2. SMS Sheet Metal Supply.

7 **2.2 PERFORMANCE REQUIREMENTS**

- 8 A. Structural Performance: Provide flat-lock panel assemblies capable of withstanding the effects of load and
9 stresses from wind loads, dead loads, snow loads and normal and expected thermal movement without
10 evidence of permanent defects of the assemblies, based on testing according to ASTM E330:
11 1. Wind Loads: As indicated on Drawings. Acting inwards and outwards.
12 2. Other Design Loads: As indicated on Drawings.
13 3. Dead Load as required by applicable building code.
14 4. Live Load as required by applicable building code.
15 5. Deflection Limits: For wind loads, no greater than 1/60 of the span.
16 B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by
17 preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of
18 connections, and other detrimental effects. Base calculations on surface temperatures of materials due to
19 both solar heat gain and nighttime-sky heat loss.
20 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

21 **2.3 METAL PLATE WALL PANELS (MTLPNL-4**

- 22 A. System: Light gauge back ventilated Aluminum wall panel system that provides a longitudinal flat seam.
23 Interlocking fold on all four sides uses a traditional clip-style installation mechanically fastened assembly to
24 substructure.
25 B. Aluminum Sheet: Tension-levleed, smooth aluminum sheet, ASTM B209, manufacturer's standard with
26 minimum 0.120 inch thick.
27 C. Recycled Content: 20%.
28 D. Attachment Assembly: Manufacturer's standard clip.

29 **2.4 MISCELLANEOUS MATERIALS**

- 30 A. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to
31 seal against weather and to provide finished appearance. Locations include, but are not limited to, bases,
32 drips, sills, jambs, corners, end walls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and
33 fillers. Finish flashing and trim with same finish system as adjacent metal panels.
34 B. Panel Fasteners: Self-tapping screws designed to withstand design loads.
35 C. Panel Sealants: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use
36 classifications required to seal joints in metal panels and remain weathertight; and as recommended in
37 writing by metal panel manufacturer. Provide sealant types that are compatible with panel materials, are
38 nonstaining, and do not damage panel finish.

39 **2.5 FABRICATION**

- 40 A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard
41 procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by
42 laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
43 B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's
44 recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to
45 design, dimensions, metal, and other characteristics of item indicated.
46 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool
47 marks and that are true to line and levels indicated.
48 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams.
49 3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to
50 comply with SMACNA standards.
51 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on
52 faces of accessories exposed to view.
53

- 1 5. Fabricate cleats and attachment devices from stainless steel material or from compatible,
2 noncorrosive metal recommended in writing by metal panel manufacturer.
3 a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall
4 panel manufacturer for application but not less than thickness of metal being secured.

5 **2.6 FINISHES**

- 6 A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable,
7 temporary protective covering before shipping.
8 B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if
9 they are within one-half of the range of approved Samples. Noticeable variations in same piece are not
10 acceptable. Variations in appearance of other components are acceptable if they are within the range of
11 approved Samples and are assembled or installed to minimize contrast.
12 C. Aluminum Panels and Accessories:
13 1. Exposed Anodized Finish:
14 a. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

15 **PART 3 - EXECUTION**

16 **3.1 EXAMINATION**

- 17 A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for
18 installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
19 1. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that
20 installation is within flatness tolerances required by metal wall panel manufacturer.
21 a. Verify that air- or water-resistive barriers have been installed over sheathing or backing
22 substrate to prevent air infiltration or water penetration.
23 B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of
24 penetrations relative to seam locations of metal panels before installation.
25 C. Proceed with installation only after unsatisfactory conditions have been corrected.

26 **3.2 INSTALLATION**

- 27 A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and
28 locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal
29 panels and other components of the Work securely in place, with provisions for thermal and structural
30 movement.
31 1. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not
32 begin installation until air- or water-resistive barriers and flashings that will be concealed by metal
33 panels are installed.
34 2. Install screw fasteners in predrilled holes.
35 3. Locate and space fastenings in uniform vertical and horizontal alignment.
36 4. Install flashing and trim as metal panel work proceeds.
37 5. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
38 B. Fasteners:
39 1. Aluminum Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use aluminum
40 or galvanized-steel fasteners for surfaces exposed to the interior.
41 C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against
42 galvanic action as recommended in writing by metal panel manufacturer.
43 D. Clip Installation: Attach panel clips to supports at locations, spacings, and with fasteners recommended by
44 manufacturer.
45 E. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions,
46 and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set
47 units true to line and level as indicated. Install work with laps, joints, and seams that are permanently
48 watertight.
49 1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and
50 levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim
51 to fit substrates and to result in waterproof performance.
52 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space
53 movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or
54 intersection. Where lapped expansion provisions cannot be used or would not be sufficiently
55 waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled
56 with mastic sealant (concealed within joints).

1 **3.3 ERECTION TOLERANCES**
2 A. Installation Tolerances: Align metal wall panel units within installed tolerance of 1/4 inch in 20 feet, non-
3 accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces
4 and of alignment of matching profiles.

5 **3.4 CLEANING AND PROTECTION**
6 A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless
7 otherwise indicated in manufacturer's written installation instructions. On completion of metal panel
8 installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean
9 condition during construction.
10 B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
11 C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish
12 touchup or similar minor repair procedures.

13 **END OF SECTION**

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ROOF SPECIALTIES

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25 **PART 1 - GENERAL**

26 **1.1 SUMMARY**

- 27 A. Section Includes:
28 1. Copings.
29 2. Roof-edge drainage systems.
30 3. Reglets and counterflashings.
31 B. Related Sections:
32 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
33 C. Preinstallation Conference: Conduct conference at Project site.

34 **1.2 ACTION SUBMITTALS**

- 35 A. Product Data: For each type of product.
36 B. Sustainable Design Submittals:
37 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and
38 cost.
39 C. Shop Drawings: For roof specialties.
40 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work.
41 Distinguish between plant- and field-assembled work.
42 D. Samples: For each type of roof specialty and for each color and texture specified.

43 **1.3 INFORMATIONAL SUBMITTALS**

- 44 A. Product Test Reports: For tests performed by a qualified testing agency.
45 B. Sample warranty.

46 **1.4 CLOSEOUT SUBMITTALS**

- 47 A. Maintenance Data: For roofing specialties to include in maintenance manuals.

48 **1.5 QUALITY ASSURANCE**

- 49 A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are SPRI
50 ES-1 tested to specified design pressure.

1 **1.6 WARRANTY**

- 2 A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that
3 show evidence of deterioration of factory-applied finishes within specified warranty period.
4 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
5 a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
6 b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
7 c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
8 2. Finish Warranty Period: 10 years from date of Substantial Completion.

9 **PART 2 - PRODUCTS**

10 **2.1 PERFORMANCE REQUIREMENTS**

- 11 A. Recycled Content: Not less than 25 percent.
12 B. SPRI Wind Design Standard: Manufacture and install copings tested according to SPRI ES-1 and capable
13 of resisting the following design pressures:
14 1. Design Pressure: As indicated on Drawings.
15 C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to
16 prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants,
17 failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress
18 as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar
19 heat gain and nighttime-sky heat loss.
20 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

21 **2.2 COPINGS**

- 22 A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding
23 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish
24 matching coping caps.
25 1. Metallic-Coated Steel Sheet Coping Caps: Zinc-coated (galvanized) steel, nominal thickness as
26 required to meet performance requirements.
27 a. Surface: Smooth, flat finish.
28 b. Finish: Three-coat fluoropolymer.
29 c. Color: Refer Material Tag Index.
30 2. Corners: Factory mitered and soldered.
31 3. Coping-Cap Attachment Method: face leg hooked to continuous cleat with back leg fastener
32 exposed, fabricated from coping-cap material.
33 a. Face-Leg Cleats: Concealed, continuous stainless steel.

34 **2.3 ROOF-EDGE DRAINAGE SYSTEMS**

- 35 A. Downspouts:
36 1. Open-face rectangular complete with mitered elbows, manufactured from the following exposed
37 metal. Furnish with metal hangers, from same material as downspouts, and anchors.
38 a. Zinc-Coated Steel: Nominal 0.034-inch thickness.
39 b. Size: Refer to Drawings.
40 B. Gutters:
41 1. Zinc-Coated Steel: Nominal 0.028-inch thickness.
42 2. Profile and Size: Refer to Drawings.
43 C. Zinc-Coated Steel Finish: Three-coat fluoropolymer.
44 1. Color: Refer Material ID List.

45 **2.4 MANUFACTURED REGLETS**

- 46 A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet
47 and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners
48 and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.
49 1. Material: Zinc-Tin Alloy-Coated Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

50 **2.5 REGLETS AND COUNTERFLASHINGS**

- 51 A. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing
52 pieces.
53 B. Counterflashing; Refer to Section 07 62 00.

1 **2.6 UNDERLAYMENT MATERIALS**

- 2 A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting
3 polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-
4 paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
5 1. Thermal Stability: ASTM D 1970/D 1970M; stable after testing at 240 deg F.
6 2. Low-Temperature Flexibility: ASTM D 1970/D 1970M; passes after testing at minus 20 deg F.

7 **2.7 MISCELLANEOUS MATERIALS**

- 8 A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet
9 performance requirements. Furnish the following unless otherwise indicated:
10 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet
11 metal.
12 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
13 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-
14 coated steel according to ASTM A 153/A 153M or ASTM F 2329 with finish matching sheet finish.
15 B. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use
16 classifications required by roofing-specialty manufacturer for each application.
17 C. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

18 **PART 3 - EXECUTION**

19 **3.1 UNDERLAYMENT INSTALLATION**

- 20 A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature
21 restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed
22 water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges
23 not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
24 1. Apply continuously under copings.
25 2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements
26 for continuity with adjacent air barrier materials.

27 **3.2 INSTALLATION, GENERAL**

- 28 A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties
29 securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective
30 coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-
31 specialty systems.
32 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without
33 warping, jogs in alignment, buckling, or tool marks.
34 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
35 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and
36 dimensions of surfaces to be covered before manufacture.
37 4. Torch cutting of roof specialties is not permitted.
38 5. Do not use graphite pencils to mark metal surfaces.
39 B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with
40 each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other
41 permanent separation as recommended by manufacturer.
42 1. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof
43 specialties for waterproof performance.
44 C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
45 1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or
46 intersections unless otherwise indicated on Drawings.
47 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for
48 50 percent movement each way. Adjust setting proportionately for installation at higher ambient
49 temperatures.
50 D. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches
51 for nails and not less than 3/4 inch for wood screws.
52 E. Seal concealed joints with sealant as required by roofing-specialty manufacturer.
53 F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do
54 not install sealants at temperatures below 40 deg F.

1 **3.3 COPING INSTALLATION**

- 2 A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed
3 fasteners.
4 B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance
5 requirements.
6 1. Interlock face-leg drip edge into continuous cleat anchored to substrate at manufacturer's required
7 spacing that meets performance requirements. Anchor back leg of coping with screw fasteners and
8 elastomeric washers at manufacturer's required spacing that meets performance requirements.

9 **3.4 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION**

- 10 A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's
11 written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage
12 system.
13 B. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal
14 standard unless otherwise indicated.
15 C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners
16 designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and
17 bottom and at approximately 48 inches o.c.
18 1. Provide elbows at base of downspouts at grade to direct water away from building.
19 D. Parapet Scuppers: Install scuppers through parapet where indicated. Continuously support scupper, set to
20 correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing
21 membrane.
22 E. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet
23 metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat
24 anchored to substrate.

25 **3.5 REGLET AND COUNTERFLASHING INSTALLATION**

- 26 A. Embedded Reglets: See Drawings for installation of reglets.
27 B. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is
28 required. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.

29 **3.6 CLEANING AND PROTECTION**

- 30 A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
31 B. Remove temporary protective coverings and strippable films as roof specialties are installed.

32 **END OF SECTION**

SECTION 07 72 00
ROOF ACCESSORIES

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PART 3 – EXECUTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Roof hatches.
- B. Related Work:
 - 1. Section 05 50 00 "Metal Fabrications" for metal ships' ladders for access to roof hatches.
 - 2. Section 06 10 00 – Rough Carpentry: for field constructed curbs.
 - 3. Safety Railings for all roof hatches.
 - 4. Safety posts for vertical ladder access roof hatches.
- C. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

1.3 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.4 ACTION SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected Work.
 - a. Hatch Units: Show types, elevations, thickness of metals, and full size profiles.
 - b. Hardware: Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware, and details of installation.
 - c. General: Show connections of units and hardware to other Work. Include schedules showing location of each type and size of unit.
- B. Product Data: Manufacturer's technical data for each type of hatch assembly, including setting drawings, templates, finish requirements, and details of anchorage devices.
 - 1. Include complete schedule, types, locations, construction details, finishes, latching or locking provisions, and other pertinent data.
- C. Sustainability Submittals:
 - 1. Recycled Content: Certificate of pre-consumer and post-consumer recycled content and cost.
- D. Samples: For each exposed product and for each color and texture specified.

1 **1.5 INFORMATIONAL SUBMITTALS**

2 A. Sample warranties.

3 **1.6 QUALITY ASSURANCE**

4 A. Regulatory Requirements:

- 5 1. OSHA 29 CFR 1910.23 Guarding floor and wall openings and holes
- 6 2. OSHA 29 CFR 1926.502 Fall protection systems criteria
- 7 3. International Building Code (IBC) Section 1013.6 Roof Access
- 8 4. International Building Code (IBC) Section 1009.11 Means of Egress, Stairways, Stairway to Roof

9 **1.7 CLOSEOUT SUBMITTALS**

10 A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

11 **1.8 WARRANTY**

12 A. Provide manufacturer's standard 5 year warranty. Roof hatches shall be free from manufacturing defects in
13 materials and fabrication for a period of 5 years from the date of shipment. Should a product fail to function
14 in normal use within this period, manufacturer shall furnish a replacement or new part at Babcock-Davis's
15 discretion.

16 B. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair
17 finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within
18 specified warranty period.

- 19 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - 20 a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - 21 b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - 22 c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
- 23 2. Finish Warranty Period: 20 years from date of Substantial Completion.

24 **PART 2 - PRODUCTS**

25 **2.1 ROOF HATCH**

26 A. Roof Hatches (**HATCH-1**): Metal roof-hatch units with lids and insulated double-walled curbs, welded or
27 mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight
28 perimeter gasketing, straight sides and integrally formed deck-mounting flange at perimeter bottom. Provide
29 non-penetrating roof railings and gates.

- 30 1. Basis of Design: Babcock-Davis Type BA3054, thermally broken, insulated aluminum roof hatch.
- 31 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
32 that may be incorporated into the Work include, but are not limited to the following:
 - 33 a. Acudor Products, Inc.
 - 34 b. Bilco Company (The).

35 **2.2 FABRICATION**

36 A. Roof Hatch Type and Size: Single-leaf metal lid for ship stair access, 30 by 54 inches.

- 37 1. Loads:
 - 38 a. Units Less Than or equal to 60 inches (152 cm) in Length: Minimum 40-lbf/sq.ft (1.9-kPa)
 - 39 external live load with a maximum deflection of 1/150 of the span and 20-lbf/sq.ft (0.95-kPa)
 - 40 internal uplift load.
 - 41 2. Hatch Material:
 - 42 a. Recycled Content: Minimum 9.5% pre-consumer and 61% post-consumer recycled content.
 - 43 b. Cover: 0.0907 inch (3.2 mm) aluminum cover.
 - 44 c. Cover Insulation: 1 inch (25 mm) polystyrene.
 - 45 1) Insulation Options: 2 inch (50 mm) polyisocyanurate.
 - 46 d. Curb: 0.0907 inch (3.2 mm) aluminum with a double wall curb/liner ready EZ tabbed counter
47 flash. Mounting flange continuous around base of frame.
 - 48 1) Fabricate curbs to minimum height of 12 inches (305 mm) above roofing surface
49 unless otherwise indicated.
 - 50 2) Curb Insulation: 2 inch (50 mm) polyisocyanurate
 - 51 3. Finish: TGIC Polyester powder coat paint.
 - 52 4. Color: As selected by Architect from manufacturer's full range.
- 53

- 1 5. Hardware: Zinc plated steel.
- 2 a. Hinge Assembly: Pintle hinge with stainless steel hinge pin.
- 3 b. Spring: Gas spring with integrated damper.
- 4 c. Hold Open Device: Automatic zinc plated steel hold open arm with red vinyl grip handle.
- 5 d. Latch: Zinc plated steel spring-type slam latch with inside and outside operating turn handles
- 6 and padlock hasp provisions.
- 7 e. Pull Handle: Interior pull down handle, powder coated safety yellow.
- 8 f. Gasket: Extruded EPDM adhesive back seal, continuous around cover.

9 **2.3 MISCELLANEOUS MATERIALS**

- 10 A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous
- 11 items required by manufacturer for a complete installation.

12 **PART 3 - EXECUTION**

13 **3.1 INSTALLATION**

- 14 A. General: Verify dimensions of roof openings for roof accessories. Install roof accessories according to
- 15 manufacturer's written instructions.
- 16 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment,
- 17 buckling, or tool marks.
- 18 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
- 19 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete
- 20 installation of roof accessories and fit them to substrates.
- 21 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of
- 22 fasteners and seals.
- 23 B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with
- 24 each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other
- 25 permanent separation as recommended by manufacturer.
- 26 C. Adjust movable parts for smooth operation.
- 27 D. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware.
- 28 Adjust for proper operation.
- 29 E. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

30 **3.2 REPAIR AND CLEANING**

- 31 A. Clean exposed surfaces according to manufacturer's written instructions.
- 32 B. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup
- 33 or similar minor repair procedures.
- 34

END OF SECTION

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SECTION 07 84 13

PENETRATION FIRESTOPPING

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
 - 2. Rated elevator hoistway.
- B. Related Sections:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 04 20 00 "Concrete Unit Masonry" for rated elevator hoistway.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
 - a. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

- 1 **1.5 INFORMATIONAL SUBMITTALS**
- 2 A. Qualification Data: For Installer.
- 3 B. Product test reports.
- 4 **1.6 CLOSEOUT SUBMITTALS**
- 5 A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in
- 6 compliance with requirements and manufacturer's written instructions.
- 7 **1.7 QUALITY ASSURANCE**
- 8 A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991,
- 9 "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified
- 10 Firestop Contractor Program Requirements."
- 11 B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
- 12 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities
- 13 having jurisdiction.
- 14 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration
- 15 Firestopping" Article. Provide rated systems complying with the following requirements:
- 16 a. Penetration firestopping products bear classification marking of qualified testing and
- 17 inspecting agency.
- 18 b. Classification markings on penetration firestopping correspond to designations listed by the
- 19 following:
- 20 1) UL in its "Fire Resistance Directory."
- 21 C. Preinstallation Conference: Conduct conference at Project site.
- 22 **1.8 PROJECT CONDITIONS**
- 23 A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures
- 24 are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because
- 25 of rain, frost, condensation, or other causes.
- 26 B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of
- 27 ventilations or, where this is inadequate, forced-air circulation.
- 28 **1.9 COORDINATION**
- 29 A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is
- 30 installed according to specified requirements.
- 31 B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration
- 32 firestopping.
- 33 **PART 2 - PRODUCTS**
- 34 **2.1 PERFORMANCE REQUIREMENTS**
- 35 A. Fire-Test-Response Characteristics:
- 36 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to
- 37 authorities having jurisdiction.
- 38 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated
- 39 systems complying with the following requirements:
- 40 a. Penetration firestopping systems shall bear classification marking of a qualified testing
- 41 agency.
- 42 1) UL in its "Fire Resistance Directory."
- 43 2) Intertek Group in its "Directory of Listed Building Products."
- 44 3) FM Global in its "Building Materials Approval Guide."
- 45 **2.2 PENETRATION FIRESTOPPING SYSTEMS**
- 46 A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases,
- 47 and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems
- 48 shall be compatible with one another, with the substrates forming openings, and with penetrating items if
- 49 any.
- 50 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
- 51 that may be incorporated into the Work include, but are not limited to the following:
- 52 a. 3M Fire Protection Products:
- 53 b. Hilti, Inc.

- 1 c. Tremco, Inc.
- 2 B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per
- 3 ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
- 4 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- 5 E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25
- 6 and 450, respectively, per ASTM E 84.
- 7 1. Sealant shall have a VOC content of 250 g/L or less.
- 8 F. Accessories: Provide components for each penetration firestopping system that are needed to install fill
- 9 materials and to maintain ratings required. Use only those components specified by penetration
- 10 firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions
- 11 indicated.

12 2.3 FILL MATERIALS

- 13 A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to
- 14 moisture.
- 15 B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent
- 16 material sized to fit specific diameter of penetrant.
- 17 C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded
- 18 to galvanized-steel sheet.
- 19 D. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic
- 20 fibers, or silicone compounds.
- 21 E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one
- 22 side.
- 23 F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and
- 24 lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking,
- 25 homogeneous mortar.
- 26 G. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in
- 27 place to produce a flexible, nonshrinking foam.
- 28 H. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade
- 29 indicated below:
- 30 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces,
- 31 and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping
- 32 limits use of nonsag grade for both opening conditions.

33 2.4 MIXING

- 34 A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with
- 35 penetration firestopping system manufacturer's written instructions for accurate proportioning of materials,
- 36 water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time,
- 37 and other items or procedures needed to produce products of uniform quality with optimum performance
- 38 characteristics for application indicated.

39 PART 3 - EXECUTION

40 3.1 INSTALLATION

- 41 A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening
- 42 configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- 43 B. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to
- 44 comply with manufacturer's written instructions and with the following requirements:
- 45 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that
- 46 could interfere with adhesion of penetration firestopping materials.
- 47 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of
- 48 developing optimum bond with penetration firestopping materials. Remove loose particles
- 49 remaining from cleaning operation.
- 50 3. Remove laitance and form-release agents from concrete.
- 51 C. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended
- 52 products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed
- 53 surfaces.
- 54 D. General: Install penetration firestopping systems to comply with manufacturer's written installation
- 55 instructions and published drawings for products and applications.

- 1 E. Install forming materials and other accessories of types required to support fill materials during their
2 application and in the position needed to produce cross-sectional shapes and depths required to achieve
3 fire ratings.
4 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials
5 and other accessories not forming permanent components of firestopping.
6 F. Install fill materials by proven techniques to produce the following results:
7 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to
8 achieve required fire-resistance ratings.
9 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating
10 items.
11 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth,
12 uniform surfaces that are flush with adjoining finishes.

13 **3.2 IDENTIFICATION**

- 14 A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words
15 "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches
16 high and with minimum 0.375-inch strokes.
17 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at
18 intervals not exceeding 30 feet.
19 B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels.
20 Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system
21 edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use
22 mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to
23 surfaces on which labels are placed. Include the following information on labels:
24 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of
25 Any Damage."
26 2. Contractor's name, address, and phone number.
27 3. Designation of applicable testing and inspecting agency.
28 4. Date of installation.
29 5. Manufacturer's name.
30 6. Installer's name.

31 **3.3 FIELD QUALITY CONTROL**

- 32 A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
33 B. Where deficiencies are found or penetration firestopping system is damaged or removed because of
34 testing, repair or replace penetration firestopping system to comply with requirements.
35 C. Proceed with enclosing penetration firestopping systems with other construction only after inspection
36 reports are issued and installations comply with requirements.

37 **3.4 CLEANING AND PROTECTION**

- 38 A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning
39 materials that are approved in writing by penetration firestopping system manufacturers and that do not
40 damage materials in which openings occur.
41 B. Provide final protection and maintain conditions during and after installation that ensure that penetration
42 firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite
43 such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated
44 penetration firestopping material and install new materials to produce systems complying with specified
45 requirements.

46 **3.5 PENETRATION FIRESTOPPING SYSTEM SCHEDULE**

- 47 A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance
48 Directory" under product Category XHEZ.
49 B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's
50 "Directory of Listed Building Products" under "Firestop Systems."
51 C. Where FM Approval-approved systems are indicated, they refer to design numbers listed in FM Approval's
52 "Approval Guide" under "Wall and Floor Penetration Fire Stops."

53 **END OF SECTION**

SECTION 07 92 00
JOINT SEALANTS

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25 **PART 1 - GENERAL**

26 **1.1 RELATED DOCUMENTS**

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

29 **1.2 SUMMARY**

- 30 A. Section Includes:
- 31 1. Silicone joint sealants.
 - 32 2. Nonstaining silicone joint sealants.
 - 33 3. Mildew-resistant joint sealants.
 - 34 4. Latex joint sealants.
- 35 B. Related Sections:
- 36 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 37 2. Section 07 92 19 "Acoustical Joint Sealants" for (SLNT-1).

38 **1.3 PREINSTALLATION MEETINGS**

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

40 **1.4 ACTION SUBMITTALS**

- 41 A. Product Data: For each joint-sealant product.
- 42 B. Sustainable Design Submittals:
- 43 1. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system,
44 documentation including printed statement of VOC content.
 - 45 a. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-
46 emitting materials.
- 47 C. Samples: For each kind and color of joint sealant required.
- 48 D. Joint-Sealant Schedule: Include the following information:
- 49 1. Joint-sealant application, joint location, and designation.
 - 50 2. Joint-sealant manufacturer and product name.
 - 51 3. Joint-sealant formulation.
 - 52 4. Joint-sealant color.
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1 **1.5 INFORMATIONAL SUBMITTALS**

- 2 A. Product test reports.
- 3 B. Preconstruction laboratory test reports.
- 4 C. Preconstruction field-adhesion-test reports.
- 5 D. Field-adhesion-test reports.
- 6 E. Sample warranties.

7 **1.6 QUALITY ASSURANCE**

- 8 A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

9 **1.7 PRECONSTRUCTION TESTING**

- 10 A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below,
11 samples of materials that will contact or affect joint sealants.
 - 12 1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint
13 preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint
14 substrates.
 - 15 2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with
16 glazing and gasket materials.
 - 17 3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with stone
18 and masonry substrates.
- 19 B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint
20 substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in
21 Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

22 **1.8 WARRANTY**

- 23 A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with
24 performance and other requirements specified in this Section within specified warranty period.
 - 25 1. Warranty Period: **Two** years from date of Substantial Completion.
- 26 B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those
27 joint sealants that do not comply with performance and other requirements specified in this Section within
28 specified warranty period.
 - 29 1. Warranty Period: **Five** years from date of Substantial Completion.

30 **PART 2 - PRODUCTS**

31 **2.1 JOINT SEALANTS, GENERAL**

- 32 A. Interior Joint Sealant (**SLNT-2**).
- 33 B. Exterior Joint Sealant (**SLNT-3**).
- 34 C. VOC Content: Sealants and sealant primers shall comply with the following:
 - 35 1. Architectural sealants shall have a VOC content of 250 g/L or less.
 - 36 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
 - 37 3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.
- 38 D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

39 **2.2 NONSTAINING SILICONE JOINT SEALANTS**

- 40 A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- 41 B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50
42 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S,
43 Grade NS, Class 50, Use NT.
 - 44 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
45 that may be incorporated into the Work include, but are not limited to the following:
 - 46 a. Dow Corning Corporation.
 - 47 b. Pecora Corporation.
 - 48 c. Sika Corporation; Joint Sealants.
 - 49 d. Tremco Incorporated.

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- 1 **2.3 URETHANE JOINT SEALANTS**
- 2 A. Urethane, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement
- 3 capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25,
- 4 Uses T and NT.
- 5 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
- 6 that may be incorporated into the Work include, but are not limited to the following:
- 7 a. BASF Corporation; Construction Systems.
- 8 b. LymTal International Inc.
- 9 **2.4 IMMERSIBLE JOINT SEALANTS**
- 10 A. Immersible Joint Sealants. Suitable for immersion in liquids; ASTM C 1247, **Class 1**; tested in deionized
- 11 water unless otherwise indicated
- 12 B. Urethane, Immersible, S, P, 50, T, NT, I: Immersible, single-component, pourable, plus 50 percent and
- 13 minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920,
- 14 Type S, Grade P, Class 25, Uses T, NT, and I.
- 15 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
- 16 that may be incorporated into the Work include, but are not limited to the following:
- 17 a. Sika Corporation; Joint Sealants.
- 18 b. Tremco Incorporated.
- 19 c. W. R. Meadows, Inc.
- 20 **2.5 MILDEW-RESISTANT JOINT SEALANTS**
- 21 A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent
- 22 mold and mildew growth.
- 23 B. Silicone, Mildew Resistant, Acid Curing, S, NS, 50, NT: Mildew-resistant, single-component, nonsag, plus 50
- 24 percent and minus 50 percent movement capability, nontraffic-use, acid-curing silicone joint sealant;
- 25 ASTM C 920, Type S, Grade NS, Class 25, Use NT.
- 26 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
- 27 that may be incorporated into the Work include, but are not limited to the following:
- 28 a. Dow Corning Corporation.
- 29 b. GE Construction Sealants; Momentive Performance Materials Inc.
- 30 c. Tremco Incorporated.
- 31 C. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
- 32 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
- 33 that may be incorporated into the Work include, but are not limited to the following:
- 34 a. BASF Corporation; Construction Systems.
- 35 b. Pecora Corporation.
- 36 c. Tremco Incorporated.
- 37 **2.6 JOINT-SEALANT BACKING**
- 38 A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size
- 39 and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- 40 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
- 41 that may be incorporated into the Work include, but are not limited to the following:
- 42 a. Alcot Plastics Ltd.
- 43 b. BASF Corporation; Construction Systems.
- 44 c. Construction Foam Products; a division of Nomaco, Inc.
- 45 B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.
- 46 C. Preformed Expanding Foam Sealant: Backerseal (Greyflex) by Emseal.
- 47 1. Secondary Seal and Backer for Sealant: Size and application as indicated.
- 48 **2.7 MISCELLANEOUS MATERIALS**
- 49 A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint
- 50 substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- 51 B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant
- 52 backing materials.
- 53 C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to
- 54 joints.

1 **PART 3 - EXECUTION**

2 **3.1 PREPARATION**

- 3 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:
- 4 1. Remove laitance and form-release agents from concrete.
- 5 2. 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.
- 6 B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- 7 C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.
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12 **3.2 INSTALLATION OF JOINT SEALANTS**

- 13 A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- 14 B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- 15 C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- 16 D. Preformed Expanding Foam Sealant:
- 17 1. For installation behind liquid-sealant and backer-rod:
- 18 a. Set backerrod sufficiently deep into joint to allow for installation of properly sized backer-rod set at its appropriate depth.
- 19 2. For installation behind directly-applied sealant:
- 20 a. Set backerrod back from the face of the joint to maintain effective joint geometry of 1 to 2.
- 21 b. Before applying primary wet sealant, ensure that backerrod is firmly expanded in the joint.
- 22 c. Primary sealant shall be well tooled against backerrod.
- 23 E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
- 24 1. Place sealants so they directly contact and fully wet joint substrates.
- 25 2. Completely fill recesses in each joint configuration.
- 26 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- 27 F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- 28 1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
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38 **3.3 FIELD QUALITY CONTROL**

- 39 A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
- 40 1. Extent of Testing: Test completed and cured sealant joints as follows:
- 41 a. Perform **5** tests for the first **1000 feet** of joint length for each kind of sealant and joint substrate.
- 42 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.
- 43 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 requirements. Retest failed applications until test results prove sealants comply with indicated requirements.
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- 1 **3.4 JOINT-SEALANT SCHEDULE**
- 2 A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces **JS-1**.
- 3 1. Joint Locations:
- 4 a. Isolation and contraction joints in cast-in-place concrete slabs.
- 5 b. Joints in stone paving units, including steps.
- 6 c. Tile control and expansion joints.
- 7 d. Joints between different materials listed above.
- 8 e. Other joints as indicated on Drawings.
- 9 2. Joint Sealant: Urethane, M, P, 50, T, NT.
- 10 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- 11 B. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces subject to water immersion **JS-2**.
- 12 1. Joint Locations:
- 13 a. Joints in pedestrian plazas.
- 14 b. Other joints as indicated on Drawings.
- 15 2. Joint Sealant: Urethane, immersible, S, P, 50, T, NT, I.
- 16 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- 17 C. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces **JS-3**.
- 18 1. Joint Locations:
- 19 a. Construction joints in cast-in-place concrete.
- 20 b. Joints between plant-precast architectural concrete units.
- 21 c. Control and expansion joints in unit masonry.
- 22 d. Joints in dimension stone cladding.
- 23 e. Joints between stone or masonry exterior envelope components/assemblies and window and
- 24 door frames and/or subframes.
- 25 f. Other joints as indicated on Drawings.
- 26 2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
- 27 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors
- 28 D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces **JS-4**.
- 29 1. Joint Locations:
- 30 a. Isolation joints in cast-in-place concrete slabs.
- 31 b. Control and expansion joints in stone flooring.
- 32 c. Control and expansion joints in brick flooring.
- 33 d. Control and expansion joints in tile flooring.
- 34 e. Other joints as indicated on Drawings.
- 35 2. Joint Sealant: Urethane, S, P, 50, T, NT.
- 36 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- 37 E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces **JS-5**.
- 38 1. Joint Locations:
- 39 a. Control and expansion joints on exposed interior surfaces of exterior walls.
- 40 b. Tile control and expansion joints.
- 41 c. Vertical joints on exposed surfaces of unit masonry walls and partitions.
- 42 d. Joints on underside of plant-precast structural concrete
- 43 e. Other joints as indicated on Drawings.
- 44 2. Joint Sealant: Urethane, S, NS, 50, NT.
- 45 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- 46 F. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to
- 47 significant movement **JS-6**.
- 48 1. Joint Locations:
- 49 a. Control joints on exposed interior surfaces of exterior walls.
- 50 b. Perimeter joints between interior wall surfaces and frames of interior doors, windows and
- 51 elevator entrances.
- 52 c. Other joints as indicated on Drawings.
- 53 2. Joint Sealant: Acrylic latex.
- 54 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
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- 1 G. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic
2 surfaces **JS-7**.
3 1. Joint Locations:
4 a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
5 b. Tile control and expansion joints where indicated.
6 c. Other joints as indicated on Drawings.
7 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 50, NT.
8 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
9 H. Joint-Sealant Application: Concealed mastics **JS-8**.
10 1. Joint Locations:
11 a. Aluminum thresholds.
12 b. Sill plates.
13 c. Other joints as indicated on Drawings.

14 **END OF SECTION**

SECTION 07 92 19
ACOUSTICAL JOINT SEALANTS

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17 **PART 1 - GENERAL**

18 **1.1 RELATED DOCUMENTS**

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

21 **1.2 SUMMARY**

- 22 A. Section includes acoustical joint sealants.
23 B. Related Requirements:
24 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

25 **1.3 ACTION SUBMITTALS**

- 26 A. Product Data: For each acoustical joint sealant.
27 B. Sustainable Design Submittals:
28 1. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system,
29 documentation including printed statement of VOC content.
30 a. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-
31 emitting materials.
32 C. Samples: For each kind and color of acoustical joint sealant required.
33 D. Acoustical-Joint-Sealant Schedule: Include the following information:
34 1. Joint-sealant application, joint location, and designation.
35 2. Joint-sealant manufacturer and product name.
36 3. Joint-sealant formulation.
37 4. Joint-sealant color.

38 **1.4 INFORMATIONAL SUBMITTALS**

- 39 A. Product test reports.
40 B. Sample warranties.

41 **1.5 WARRANTY**

- 42 A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply
43 with performance and other requirements specified in this Section within specified warranty period.
44 1. Warranty Period: Two years from date of Substantial Completion.
45 B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or
46 replace those joint sealants that do not comply with performance and other requirements specified in this
47 Section within specified warranty period.
48 1. Warranty Period: **5** years from date of Substantial Completion.

1 **PART 2 - PRODUCTS**

2 **2.1 PERFORMANCE REQUIREMENTS**

- 3 A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through
4 perimeter joints and openings in building construction, as demonstrated by testing representative assemblies
5 according to ASTM E 90.
6 1. Sealant shall have a VOC content of 250 g/L or less.

7 **2.2 ACOUSTICAL JOINT SEALANTS**

- 8 A. Acoustical Sealant (**SLNT-1**): Manufacturer's standard nonsag, paintable, nonstaining latex acoustical
9 sealant complying with ASTM C 834.
10 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
11 that may be incorporated into the Work include, but are not limited to the following:
12 a. Dynatrol I-XL, Pecora Corporation.
13 b. 860, 890 or 895 series Silicone Sealant, Pecora Corporation.
14 c. Ultra Pruf II Silicone Sealant, General Electric Company.
15 d. SpecSeal ES100, Specified Technologies, Inc.
16 e. Sonoplastic NP1, Manufacturer.
17 f. Spectrem 3, Tremco Commercial Sealants & Waterproofing.
18 g. Dymonic, Tremco Commercial Sealants & Waterproofing.
19 h. Vulkem 45, Tremco Commercial Sealants & Waterproofing.
20 i. Speedspray 572, Hilti.
21 j. CP 506 Smoke and Acoustic Sealant, Hilti.
22 k. BA-98, Pecora Corporation.
23 l. Acoustic Sealant, Tremco Commercial Sealants & Waterproofing.
24 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range
25 of colors.
26 B. For backbox putty, select one of the following, including all manufacturer-recommended accessories, in
27 conformance with Division 7 - Sealants:
28 1. SpecSeal SSP Intumescent Putty, Specified Technologies, Inc., Somerville, NJ
29 2. IsoBacker, Kinetics Noise Products
30 3. Firestop Putty Pads, Acoustical Solutions
31 C. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of
32 sealant to joint substrates.
33 D. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant
34 backing materials.
35 E. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to
36 joints.
37

1 **PART 3 - EXECUTION**

2 **3.1 PREPARATION**

- 3 A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply
4 with joint-sealant manufacturer's written instructions.
5 B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer.
6 C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining
7 surfaces.

8 **3.2 INSTALLATION OF ACOUSTICAL JOINT SEALANTS**

- 9 A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent
10 requirements apply.
11 B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and
12 penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces
13 of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and
14 manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies,
15 including sealing partitions to underside of floor slabs above acoustical ceilings.
16 C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling
17 areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

18 **3.3 CLEANING**

- 19 A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with
20 cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which
21 joints occur.

22 **3.4 PROTECTION**

- 23 A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances
24 and from damage resulting from construction operations or other causes so sealants are without
25 deterioration or damage at time of Substantial Completion. If, despite such protection, damage or
26 deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants
27 immediately so installations with repaired areas are indistinguishable from original work.

28 **END OF SECTION**

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SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

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25 **PART 1 - GENERAL**

26 **1.1 RELATED DOCUMENTS**

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

29 **1.2 SUMMARY**

- 30 A. Section includes hollow-metal work.
31 B. Related Sections:
32 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

33 **1.3 DEFINITIONS**

- 34 A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803
35 or SDI A250.8.

36 **1.4 COORDINATION**

- 37 A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and
38 directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with
39 integral anchors. Deliver such items to Project site in time for installation.
40 B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control
41 and security systems.

42 **1.5 PREINSTALLATION MEETINGS**

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

44 **1.6 ACTION SUBMITTALS**

- 45 A. Product Data: For each type of product.
46 B. Sustainable Design Submittals:
47 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
48 and cost.

- 1 C. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for
- 2 hardware, and other details.
- 3 D. Samples for Initial Selection: For units with factory-applied color finishes.
- 4 E. Samples for Verification: For each type of exposed finish required.
- 5 F. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and
- 6 openings as those on Drawings.

7 **1.7 INFORMATIONAL SUBMITTALS**

- 8 A. Product test reports.

9 **PART 2 - PRODUCTS**

10 **2.1 MANUFACTURERS**

- 11 A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
- 12 may be incorporated into the Work include, but are not limited to the following:
- 13 1. Amweld Building Products, LLC
- 14 2. Curries Company; ASSA ABLOY.
- 15 3. LaForce, Inc.
- 16 4. Steelcraft; an Allegion brand.

17 **2.2 REGULATORY REQUIREMENTS**

- 18 A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency
- 19 acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated,
- 20 based on testing at positive pressure according to NFPA 252 or UL 10C.
- 21 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for
- 22 smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction,
- 23 based on testing according to UL 1784 and installed in compliance with NFPA 105.
- 24 B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and
- 25 inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based
- 26 on testing according to NFPA 257 or UL 9.

27 **2.3 INTERIOR DOORS AND FRAMES**

- 28 A. Standard-Duty Doors and Frames: SDI A250.8, Level 1. At locations indicated in the Door and Frame
- 29 Schedule.
- 30 1. Physical Performance: Level C according to SDI A250.4.
- 31 2. Doors:
- 32 a. Type: As indicated in the Door and Frame Schedule.
- 33 b. Thickness: 1-3/4 inches.
- 34 c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.032 inch.
- 35 d. Edge Construction: Model 1, Full Flush.
- 36 e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane,
- 37 polyisocyanurate, mineral-board, or vertical steel-stiffener core.
- 38 1) Fire Door Core: As required to provide fire-protection and temperature-rise ratings
- 39 indicated.
- 40 2) Acoustic Rated Door: As required to provide acoustic ratings indicated.
- 41 3. Frames:
- 42 a. Materials: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
- 43 b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door
- 44 frame.
- 45 c. Construction: Full profile welded.
- 46 4. Exposed Finish: Factory Prime, field painted. Refer to Material ID List.
- 47

- 1 B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2. At locations indicated in the Door and Frame
2 Schedule.
3 1. Physical Performance: Level B according to SDI A250.4.
4 2. Doors:
5 a. Type: As indicated in the Door and Frame Schedule.
6 b. Thickness: 1-3/4 inches.
7 c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
8 d. Edge Construction: Model 1, Full Flush.
9 e. Core: Manufacturer's standard Kraft-paper honeycomb, Polystyrene, Polyurethane,
10 Polyisocyanurate, Mineral board or Vertical steel stiffener.
11 3. Frames:
12 a. Materials: Uncoated, steel sheet, minimum thickness of 0.053 inch.
13 b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door
14 frame.
15 c. Construction: Full profile welded.
16 4. Exposed Finish: Factory Prime, field painted. Refer to Material ID List.

17 **2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES**

- 18 A. Heavy-Duty Doors and Frames: SDI A250.8, Level 2. At locations indicated in the Door and Frame
19 Schedule.
20 1. Physical Performance: Level B according to SDI A250.4.
21 2. Doors:
22 a. Type: As indicated in the Door and Frame Schedule.
23 b. Thickness: 1-3/4 inches.
24 c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch, with minimum A40
25 coating.
26 d. Edge Construction: Model 1, Full Flush.
27 e. Core: Manufacturer's standard insulation material: Polystyrene, Polyurethane or
28 Polyisocyanurate.
29 3. Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less
30 than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
31 4. Frames:
32 a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40
33 coating.
34 b. Construction: Full profile welded.
35 5. Exposed Finish: Factory Prime, field painted. Refer to Material ID List.

36 **2.5 BORROWED LITES**

- 37 A. Hollow-metal frames of **uncoated** steel sheet, minimum thickness of **0.053 inch**.
38 B. Construction: Full profile welded.

39 **2.6 FRAME ANCHORS**

- 40 A. Jamb Anchors:
41 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than
42 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long;
43 or wire anchors not less than 0.177 inch thick.
44 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
45 3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
46 4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts
47 with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement
48 plate, welded to frame at each anchor location.
49 B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
50 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
51 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less
52 than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

53 **2.7 MATERIALS**

- 54 A. Recycled Content of Steel Products: Not less than 25 percent.
55 B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed
56 applications.

- 1 C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or
- 2 surface defects; pickled and oiled.
- 3 D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- 4 E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill
- 5 phosphatized.
- 6 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or
- 7 ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- 8 F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- 9 G. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.
- 10 H. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to
- 11 ASTM C 143/C 143M.
- 12 I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing).
- 13 J. Glazing: Section 08 80 00 "Glazing."
- 14 K. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat.

15 2.8 FABRICATION

- 16 A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to
- 17 required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble
- 18 units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot
- 19 be permanently factory assembled before shipment.
- 20 B. Hollow-Metal Doors:
- 21 1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to
- 22 escape. Seal joints in top edges of doors against water penetration.
- 23 2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80
- 24 for fire-performance rating or where indicated.
- 25 C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations,
- 26 provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
- 27 1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or
- 28 joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by
- 29 butt welding.
- 30 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless
- 31 otherwise indicated.
- 32 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
- 33 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor;
- 34 however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
- 35 5. Jamb Anchors: Provide number and spacing of anchors as follows:
- 36 a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame.
- 37 Space anchors not more than 32 inches o.c., to match coursing, and as follows:
- 38 1) Two anchors per jamb up to 60 inches high.
- 39 2) Three anchors per jamb from 60 to 90 inches high.
- 40 3) Four anchors per jamb from 90 to 120 inches high.
- 41 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or
- 42 fraction thereof above 120 inches high.
- 43 b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame.
- 44 Space anchors not more than 32 inches o.c. and as follows:
- 45 1) Three anchors per jamb up to 60 inches high.
- 46 2) Four anchors per jamb from 60 to 90 inches high.
- 47 3) Five anchors per jamb from 90 to 96 inches high.
- 48 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or
- 49 fraction thereof above 96 inches high.
- 50 c. Compression Type: Not less than two anchors in each frame.
- 51 d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom
- 52 of frame. Space anchors not more than 26 inches o.c.
- 53 6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.
- 54 a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
- 55 b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- 56 D. Removable Center Mullions: Interior frames scheduled for pairs of doors shall be provided with removable
- 57 center mullion. Refer to Section 08 71 00 – Door Hardware for door frame and door hardware preparation
- 58 required.
- 59

- 1 E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware;
2 include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door
3 Hardware Schedule, and templates.
4 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door
5 hardware.
6 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-
7 metal work for hardware.
8 F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form
9 corners of stops and moldings with mitered hairline joints.
10 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
11 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is
12 capable of being removed independently.
13 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and
14 frames.
15 4. Provide loose stops and moldings on inside of hollow-metal work.
16 5. Coordinate rabbet width between fixed and removable stops with glazing and installation types
17 indicated.

18 **2.9 STEEL FINISHES**

- 19 A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
20 1. Shop Primer: SDI A250.10.
21 B. Factory Finish: SDI A250.3.
22 1. Color and Gloss: As selected by Architect from manufacturer's full range.

23 **2.10 ACCESSORIES**

- 24 A. Louvers: Provide sightproof louvers for interior doors, where indicated, which comply with SDI 111C, with
25 blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
26 1. Fire-Rated Automatic Louvers: Movable blades closed by actuating fusible link, and listed and
27 labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated.
28 B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
29 C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

30 **PART 3 - EXECUTION**

31 **3.1 INSTALLATION**

- 32 A. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other
33 openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by
34 standards specified.
35 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors
36 are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and
37 undamaged.
38 a. At fire-rated openings, install frames according to NFPA 80.
39 b. Where frames are fabricated in sections because of shipping or handling limitations, field
40 splice at approved locations by welding face joint continuously; grind, fill, dress, and make
41 splice smooth, flush, and invisible on exposed faces.
42 c. Install frames with removable stops located on secure side of opening.
43 d. Install door silencers in frames before grouting.
44 e. Remove temporary braces necessary for installation only after frames have been properly
45 set and secured.
46 f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to
47 comply with installation tolerances.
48 g. Field apply bituminous coating to backs of frames that will be filled with grout containing
49 antifreezing agents.
50 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure
51 with postinstalled expansion anchors.
52 a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion
53 anchors if so indicated and approved on Shop Drawings.
54 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
55 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames
56 and masonry with grout.

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5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
 - c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch.
 - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- C. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

28 **3.2 ADJUSTING AND CLEANING**

- 29 A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection.
- 30 Leave work in complete and proper operating condition. Remove and replace defective work, including
- 31 hollow-metal work that is warped, bowed, or otherwise unacceptable.
- 32 B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- 33 C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and
- 34 apply touchup of compatible air-drying, rust-inhibitive primer.
- 35 D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according
- 36 to manufacturer's written instructions.
- 37 E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting
- 38 Sections.
- 39

END OF SECTION

SECTION 08 31 13
ACCESS DOORS AND FRAMES.

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3 PART 1 – GENERAL
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5 1.2 SUMMARY
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8 2.2 ACCESS DOORS AND FRAMES
9 2.4 MATERIALS
10 2.5 FABRICATION
11 2.6 FINISHES
12 PART 3 – EXECUTION
13 3.1 INSTALLATION

14 **PART 1 - GENERAL**

15 **1.1 RELATED DOCUMENTS**

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

18 **1.2 SUMMARY**

- 19 A. Section includes access doors and frames for walls and ceilings.
20 B. Related Requirements:
21 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
22 2. Section 08 71 00 "Door Hardware" for keyed cylinder.

23 **1.3 ACTION SUBMITTALS**

- 24 A. Product Data: For each type of product.
25 B. Sustainability:
26 1. Health Product Declaration. Submit complete Health Product Declaration with full disclosure of
27 known hazards in compliance with the Health Product Declaration open Standard.
28 C. Samples: For each type of access door and frame and for each finish specified.
29 D. Product Schedule: For access doors and frames use same designations indicated on Drawings.

30 **PART 2 - PRODUCTS**

31 **2.1 ACCESS DOORS AND FRAMES**

- 32 A. Flush Access Doors with Exposed Flanges (**ACCESS-1**):
33 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
34 that may be incorporated into the Work include, but are not limited to the following:
35 a. Acudor Products, Inc.
36 b. Babcock-Davis.
37 c. JL Industries, Inc.; a division of the Activar Construction Products Group.
38 d. Larsens Manufacturing Company.
39 e. MIFAB, Inc.
40 f. Milcor; Commercial Products Group of Hart & Cooley, Inc.
41 g. Nystrom, Inc.
42 2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
43 3. Locations: Wall and ceiling.
44 4. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed.
45 5. Latch and Lock:
46 a. Non-public Areas: Cam latch, screwdriver operated.
47 b. Non-supervised Public Areas: Keyed mortised cam lock.

48 **2.2 MATERIALS**

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

- 1 B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet
2 substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
3 C. Frame Anchors: Same material as door face.
4 D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or
5 ASTM F 2329.

6 **2.3 FABRICATION**

- 7 A. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with
8 smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller
9 marks, rolled trade names, or roughness.
10 B. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting
11 holes, attachment devices and fasteners of type required to secure access doors to types of supports
12 indicated.
13 C. Latch and Lock Hardware:
14 1. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in
15 Section 08 71 00 "Door Hardware."

16 **2.4 FINISHES**

- 17 A. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating,
18 and applying and baking finish.
19 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer
20 immediately after surface preparation and pretreatment.

21 **PART 3 - EXECUTION**

22 **3.1 INSTALLATION**

- 23 A. Comply with manufacturer's written instructions for installing access doors and frames.
24 B. Adjust doors and hardware, after installation, for proper operation.

25 **END OF SECTION**

SECTION 08 33 13

COILING COUNTER DOORS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Counter doors.

- B. Related Requirements:

1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
2. Section 05 50 00 "Metal Fabrications" for door-opening framing.
3. Section 08 71 00 "Door Hardware" for keyed cylinder.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of coiling counter door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. Show locations of controls, locking devices, and other accessories.

- C. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

1. Curtain slats.
2. Include similar Samples of accessories involving color selection.

1 **1.4 CLOSEOUT SUBMITTALS**

- 2 A. Maintenance Data: For coiling counter doors to include in maintenance manuals.
3 B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to
4 which door accesses.

5 **1.5 QUALITY ASSURANCE**

- 6 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
7 manufacturer for both installation and maintenance of units required for this Project.
8 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business
9 to Project site.

10 **PART 2 - PRODUCTS**

11 **2.1 COUNTER DOOR ASSEMBLY (COIL-2)**

- 12 A. Basis-of-Design Product: Subject to compliance with requirements, provide Rolling counter shutters shall be
13 DuraShutter Standard Model CP as manufactured by Raynor of Dixon, Illinois or comparable product by one
14 of the following:
15 1. C.H.I. Overhead Doors, Inc.
16 2. Clopay Building Products.
17 3. Wayne-Dalton Corp.
18 B. Source Limitations: Obtain coiling counter doors from single source from single manufacturer.

19 **2.2 OPERATION**

- 20 A. Operation Type: Rolling counter shutters shall be operated by:
21 1. Hand Crank: as normally-provided by means of a gear reduction hand crank, for shutter doors over
22 10 feet wide and/or 7 feet high.
23 B. Mounting:
24 1. Between-Jamb Mounting: Provided and fastened between the jambs of the wall opening.
25 C. Integral Frame: Rolling counter shutter may be provided with an integral frame, with the shutter factory pre-
26 installed in a completed frame assembly:
27 1. Painted Build-in Frame: as optionally-provided, for use with masonry block wall construction.

28 **2.3 CURTAIN**

- 29 A. Material: The curtain shall consist of 22 gauge (.030 minimum steel thickness) interlocking steel slats roll-
30 formed from commercial quality hot-dipped galvanized (G-90) steel per ASTM A-653.
31 B. Slat Type: The rolling counter shutter curtain shall be comprised of interlocking, flat type steel slats.
32 C. Finish/Color: The curtain shall be finished in:
33 1. ArmorBrite Powdercoat: Color as selected by Architect.
34 D. Endlocks: Lateral movement of the slats to be contained by means of zinc-plated stamped steel endlocks
35 fastened to the slat.
36 E. Bottom Bar and Seal: Bottom bar shall be roll-formed painted tubular steel. The bottom bar shall include
37 1/4 inch thick protective strip to cushion impact of bottom bar on countertop.

38 **2.4 GUIDES**

- 39 A. Guide Assemblies: Guides shall consist of 13 gauge (.086 minimum thickness) steel, formed from
40 galvanized steel and finished to match the curtain.
41 B. Wear Strips: Rolling counter shutter shall be furnished with wool pile wear strips inside the guides to
42 discourage the curtain from premature wear and noise.

43 **2.5 COUNTERBALANCE SYSTEM**

- 44 A. Headplates: Mounting brackets shall be made from 10 gauge galvanized steel plate and attached to the
45 wall and guide.
46 B. Barrel: The barrel shall be made from a minimum 4-1/2 inches O.D. x .120 inch wall structural steel pipe.
47 Deflection of pipe under full load shall not exceed .03 inch per foot of span.
48 C. Counterbalance:
49 1. The curtain shall be counterbalanced by means oil-tempered, helical torsion springs, grease packed
50 and mounted on a continuous steel torsion shaft.

- 1 **2.6 ENCLOSURES**
- 2 A. Hood: Rolling counter shutter shall be furnished with a square hood enclosure comprised of 24 gauge steel
- 3 finish-painted to match the curtain.
- 4 B. Headplate Cover: Rolling counter shutter shall be furnished with an enclosure for the head plates, consisting
- 5 of 24 gauge steel finish-painted to match the curtain.
- 6 **2.7 HARDWARE**
- 7 A. Lock: Rolling counter shutter shall be provided with a lock.
- 8 1. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in
- 9 Section 08 71 00 "Door Hardware."
- 10 **2.8 COUNTER DOOR ASSEMBLY**
- 11 A. Operation Cycles: Door components and operators capable of operating for not less than 10,000. One
- 12 operation cycle is complete when a door is opened from the closed position to the fully open position and
- 13 returned to the closed position.
- 14 B. Door Finish:
- 15 1. Factory Prime Finish: Manufacturer's standard color.
- 16 **2.9 STEEL AND GALVANIZED-STEEL FINISHES**
- 17 A. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with
- 18 coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film
- 19 thickness.
- 20 B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and
- 21 thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment,
- 22 application, and minimum dry film thickness.
- 23 **PART 3 - EXECUTION**
- 24 **3.1 EXAMINATION**
- 25 A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for
- 26 substrate construction and other conditions affecting performance of the Work.
- 27 B. Examine locations of electrical connections.
- 28 C. Proceed with installation only after unsatisfactory conditions have been corrected.
- 29 **3.2 INSTALLATION**
- 30 A. Install coiling counter doors and operating equipment complete with necessary hardware, anchors, inserts,
- 31 hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- 32 **3.3 ADJUSTING**
- 33 A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or
- 34 distortion.
- 35 B. Lubricate bearings and sliding parts as recommended by manufacturer.
- 36 C. Adjust seals to provide tight fit around entire perimeter.
- 37 **3.4 MAINTENANCE SERVICE**
- 38 A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include six
- 39 months' full maintenance by skilled employees of coiling-door Installer. Include monthly preventive
- 40 maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting
- 41 as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement
- 42 parts and supplies.
- 43 1. Perform maintenance, including emergency callback service, during normal working hours.
- 44 2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.
- 45 **3.5 DEMONSTRATION**
- 46 A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust,
- 47 operate, and maintain coiling counter doors.

48 **END OF SECTION**

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SECTION 08 33 23

OVERHEAD COILING DOORS

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- 3.6 [DEMONSTRATION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Electrically operated overhead coiling doors, operators, controls and accessories.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 05 50 00 "Metal Fabrications" for steel supports.
 - 3. Section 08 71 00 "Door Hardware" for keyed cylinders.
 - 4. Division 26 "Electrical" for electrical connections and service for powered door operators.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
 - 3. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
 - 5. Include diagrams for power, signal, and control wiring.

- 1 C. Quality Assurance Submittals: Submit the following:
2 1. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

3 **1.4 CLOSEOUT SUBMITTALS**

- 4 A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

5 **1.5 QUALITY ASSURANCE**

- 6 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
7 manufacturer for both installation and maintenance of units required for this Project.
8 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of
9 business to Project site.
10 B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation
11 Barriers Compliance Board's ADA-ABA Accessibility Guidelines, ICC A117.1, and Insert requirement.

12 **PART 2 - PRODUCTS**

13 **2.1 DOOR ASSEMBLY (COIL-1)**

- 14 A. Service Door: Motorized overhead coiling door formed with curtain of interlocking metal slats.

15 **2.2 MANUFACTURERS**

- 16 A. Basis-of-Design Product: Subject to compliance with requirements, provide Raynor Duracoil or
17 comparable product by one of the following:
18 1. C.H.I. Overhead Doors, Inc.
19 2. Clopay Building Products.
20 3. Wayne-Dalton Corp.
21 B. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
22 1. Obtain operators and controls from overhead coiling door manufacturer.

23 **2.3 PERFORMANCE REQUIREMENTS**

- 24 A. Wind Loads: Uniform pressure per ASCE-7 (current version) unless indicated on the drawings.

25 **2.4 DOOR OPERATORS**

- 26 A. Provide doors designed for electric motor operation.
27 1. Drive Orientation: For electric motor operated doors, orient the drive from the side indicated on the
28 drawings when facing the reference side of the door (side with counterbalance or hood exposed).
29 2. Operator Location: As shown on Drawings.
30 3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use;
31 moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
32 4. Motor Exposure: Interior.
33 5. Emergency Manual Operation: Push-up type.
34 6. Obstruction-Detection Device: Automatic photoelectric sensor.
35 7. Control Station(s): Where shown on Drawings.
36 8. Other Equipment: Audible and visual signals.
37 9. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a
38 qualified testing agency, and marked for intended location and application.
39 B. Manufacturer Product Designation: Raynor ControlHoist Standard with Solid State motor controller (Model
40 Series CHS).
41 1. Type: Jackshaft.
42 2. Motor Horsepower Rating: Continuous 1/2 HP minimum as required.
43 3. Electrical Requirements: Refer to Electrical Drawings.
44 4. Duty Cycle: 30 cycles/hour.
45 5. Control Wiring: Contractor Style Motor starter 24 volt control with provisions for connection of safety
46 edge to reverse and external radio control hook-up. Three button momentary contact "open-close-
47 stop". Solid State motor controller 24 volt control with provisions to select up to 6 standard wiring
48 types plus delay on reverse, mid stop, maximum run timer, and door lock feature.

49 **2.5 CURTAIN**

- 50 A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats in a continuous length for
51 width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical

- 1 properties recommended by door manufacturer for performance, size, and type of door indicated, and as
2 follows:
- 3 1. Material: Interlocking steel slats, 18 gauge (0.047 inch minimum thickness), roll-formed from
4 commercial quality hot-dipped galvanized (G-90) steel in compliance with ASTM A-653.
 - 5 2. Slat Type: Insulated Flat Slat with back cover.
 - 6 a. Insulation: Polyurethane with R-value 8.0.
 - 7 b. Back Covers: Galvanized steel, 24 gauge (0.023 inch) minimum thickness.
 - 8 B. Mounting: As indicated on drawings.
 - 9 C. Color and Finish: One finish coat of ArmorBrite Powdercoat applied over one coat of white epoxy primer.
10 Color as selected by Architect.
 - 11 D. Endlocks: Lateral movement of the slats to be contained by means of zinc-plated malleable endlocks
12 fastened with two zinc-plated steel rivets.
 - 13 E. Bottom Bar and Seal: Two roll-formed galvanized steel angles, minimum 1-1/2 inches by 1-1/2 inches by
14 1/8 inch (38.1 mm x 38.1 mm x 3.2 mm) with single-contact type bottom astragal. Structural angle bottom
15 bar to receive one coat of rust-inhibitive primer.
 - 16 F. Vision Panels: None.
 - 17 G. Curtain Wear Straps: Polyester.

18 2.6 GUIDES

- 19 A. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish
20 as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow
21 curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide
22 removable stops on guides to prevent over travel of curtain.
- 23 B. Guide Assemblies: To consist of three structural steel angles, minimum 3 inches by 2 inches by 3/16 inch
24 (76 mm by 51 mm by 4.8 mm) and fitted with removable curtain stops. Steel guides to be provided with
25 one coat of rust-inhibitive primer.
- 26 C. Jamb Construction: Masonry Jambs with anchor bolt fasteners.
- 27 D. Weather Seal: Guide brush seal or snap-on vinyl seal.

28 2.7 COUNTERBALANCE SYSTEM

- 29 A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-
30 tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel
31 connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite
32 bearings for rotating members.
- 33 B. Head Plates: 3/16 inch (4.8 mm) steel plate, attached to wall angle of guide assembly with 1/2 inch (12.7
34 mm) diameter class 5 case hardened bolts. Inside of drive bracket fitted with sealed ball bearing. Provide
35 head plates with one coat of rust-inhibitive primer.
- 36 C. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 mm) wall thickness structural steel
37 pipe. Deflection of pipe under full load shall not exceed 0.03 inch (0.8 mm) per foot of span.
- 38 D. Counterbalance: Provide torsion counterbalance mechanism as follows: Torsion Spring: Oil-tempered,
39 helical torsion springs, grease packed and mounted on a continuous steel torsion shaft.

40 2.8 ENCLOSURES

- 41 A. Hood: Round Hood: 24 gauge steel, finish-painted to match curtain.
- 42 B. Hood Baffle: With EPDM rubber seal to inhibit air infiltration through hood cavity.

43 2.9 LOCKING DEVICES

- 44 A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam
45 plate, and adjustable locking bars to engage through slots in tracks.
 - 46 1. Lock Cylinders: Cylinders specified in Section 08 71 00 "Door Hardware" and keyed to building
47 keying system.
 - 48 2. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage
49 power supply when door is locked.
- 50 B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each
51 side of door, finished to match door.

1 **PART 3 - EXECUTION**

2 **3.1 EXAMINATION**

- 3 A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for
4 substrate construction and other conditions affecting performance of the Work.
5 B. Examine locations of electrical connections.
6 C. Proceed with installation only after unsatisfactory conditions have been corrected.

7 **3.2 INSTALLATION**

- 8 A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors,
9 inserts, hangers, and equipment supports; according to manufacturer's written instructions and as
10 specified.
11 B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each
12 door.
13 C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance
14 with regulatory requirements for accessibility.

15 **3.3 STARTUP SERVICE**

- 16 A. Engage a factory-authorized service representative to perform startup service.
17 1. Perform installation and startup checks according to manufacturer's written instructions.
18 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and
19 equipment.

20 **3.4 ADJUSTING**

- 21 A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or
22 distortion.
23 B. Lubricate bearings and sliding parts as recommended by manufacturer.
24 C. Adjust seals to provide tight fit around entire perimeter.

25 **3.5 MAINTENANCE SERVICE**

- 26 A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12
27 months' full maintenance by skilled employees of coiling-door Installer. Include monthly preventive
28 maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting
29 as required for door operation. Parts and supplies shall be manufacturer's authorized replacement parts
30 and supplies.
31 1. Perform maintenance, including emergency callback service, during normal working hours.
32 2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

33 **3.6 DEMONSTRATION**

- 34 A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust,
35 operate, and maintain overhead coiling doors.

36 **END OF SECTION**

SECTION 08 33 26

OVERHEAD COILING GRILLES

PART 1 – GENERAL

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- 2.2 [OPEN-CURTAIN GRILLE ASSEMBLY \(COIL-3\)](#)
- 2.3 [COUNTERBALANCE MECHANISM](#)
- 2.4 [MANUAL GRILLE OPERATORS](#)
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PART 3 – EXECUTION

- 3.1 [EXAMINATION](#)
- 3.2 [INSTALLATION](#)
- 3.3 [ADJUSTING](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Open-curtain overhead coiling grilles.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports, angle-framing of grille opening, corner guards, and bollards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling grille and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for curtain components, and finishes.
- B. Sustainability:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2. Regional Materials: Products shall be manufactured within 500 miles of Project site.
 - 3. Product Data: Certification of product manufacturing origin.
- C. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Show locations of controls, locking devices, and other accessories.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Open-curtain grille with full-size components consisting of rods, spacers, and links as required to illustrate each assembly.

- 1 **1.4 INFORMATIONAL SUBMITTALS**
- 2 A. Qualification Data: For Installer.
- 3 B. Sample Warranty: For special warranty.
- 4 **1.5 CLOSEOUT SUBMITTALS**
- 5 A. Maintenance Data: For overhead coiling grilles to include in maintenance manuals.
- 6 **1.6 QUALITY ASSURANCE**
- 7 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
- 8 manufacturer for both installation and maintenance of units required for this Project.
- 9 B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for
- 10 Accessible Design".
- 11 **1.7 WARRANTY**
- 12 A. Special Warranty: Manufacturer agrees to repair or replace components of grilles that fail in materials or
- 13 workmanship within specified warranty period.
- 14 1. Warranty Period: Two years from date of Substantial Completion.

15 **PART 2 - PRODUCTS**

- 16 **2.1 COUNTER DOOR ASSEMBLY**
- 17 A. Basis-of-Design Product: Subject to compliance with requirements, provide Rolling counter shutters shall
- 18 be DuraGrille Standard as manufactured by Raynor of Dixon, Illinois or comparable product by one of the
- 19 following:
- 20 1. C.H.I. Overhead Doors, Inc.
- 21 2. Clopay Building Products.
- 22 3. Wayne-Dalton Corp.
- 23 B. Source Limitations: Obtain coiling grilles from single source from single manufacturer.
- 24 **2.2 OPEN-CURTAIN GRILLE ASSEMBLY (COIL-3)**
- 25 A. Assembly – General:
- 26 1. Basis of Design: Raynor Duragrille Standard.
- 27 2. Security: Slide Bolt Lock, Lockable From Interior.
- 28 3. Operation: Manual Crank.
- 29 4. Finish: Clear Anodized Aluminum.
- 30 5. Mount: Face Mount
- 31 6. Grille Pattern: GSA Straight Pattern.
- 32 B. Open-Curtain Grille: Overhead coiling grille with a curtain having a network of horizontal rods that
- 33 interconnect with vertical links.
- 34 C. Operation Cycles: Grille components and operators capable of operating for not less than 10,000. One
- 35 operation cycle is complete when a grille is opened from the closed position to the fully open position and
- 36 returned to the closed position.
- 37 1. Include tamperproof cycle counter.
- 38 D. Grille Curtain Material: Aluminum.
- 39 1. Straight Pattern: Horizontal aluminum rods (5/16 inch (7.9 mm), spaced vertically at 2 inch (50.8
- 40 mm) O.C. with vertical link assemblies spaced horizontally at 9 inches (228.6 mm) O.C.. Lateral
- 41 movement of the vertical link assemblies to be contained by C-clips. Vertical link assemblies to be
- 42 held together by brass eyelets.
- 43 E. Bottom Bar: Continuous tubular shape channel or doubled angles, fabricated from aluminum extrusion and
- 44 finished to match grille.
- 45 F. Curtain Jamb Guides: Aluminum with exposed finish matching curtain slats. Provide continuous integral
- 46 wear strips to prevent metal-to-metal contact and to minimize operational noise.
- 47 G. Hood: Match curtain material and finish.
- 48 1. Shape: As indicated on Drawings.
- 49 2. Mounting: Face of wall.
- 50 H. Locking Devices: Equip grille with slide bolt for padlock.
- 51 I. Manual Grille Operator: Manufacturer's standard crank operator.
- 52 J. Grille Finish:
- 53 1. Aluminum Finish: Clear anodized.
- 54 2. PVC Spacers: Color as indicated by manufacturer's designations.

- 1 **2.3 COUNTERBALANCE MECHANISM**
2 A. General: Counterbalance grilles by means of manufacturer's standard mechanism with an adjustable-
3 tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel
4 connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite
5 bearings for rotating members.
- 6 **2.4 MANUAL GRILLE OPERATORS**
7 A. General: Equip grille with manual grille operator by grille manufacturer.
8 B. Crank Operator: Consisting of crank and crank gearbox, steel crank drive shaft, and gear-reduction unit, of
9 type indicated. Size gears to require not more than 25-lbf force to turn crank. Fabricate gearbox to be
10 oiltight and to completely enclose operating mechanism. Provide manufacturer's standard crank-locking
11 device.
- 12 **2.5 GENERAL FINISH REQUIREMENTS**
13 A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
14 B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in
15 appearance of adjoining components are acceptable if they are within the range of approved Samples and
16 are assembled or installed to minimize contrast.
- 17 **2.6 ALUMINUM FINISHES**
18 A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

19 **PART 3 - EXECUTION**

- 20 **3.1 EXAMINATION**
21 A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for
22 substrate construction and other conditions affecting performance of the Work.
23 B. Examine locations of electrical connections.
24 C. Proceed with installation only after unsatisfactory conditions have been corrected.
- 25 **3.2 INSTALLATION**
26 A. Install overhead coiling grilles and operating equipment complete with necessary hardware, anchors,
27 inserts, hangers, and equipment supports, according to manufacturer's written instructions and as
28 specified.
29 B. Install overhead coiling grilles, hoods, controls, and operators at the mounting locations indicated for each
30 grille.
31 C. Accessibility: Install overhead coiling grilles, switches, and controls along accessible routes in compliance
32 with the accessibility standard.
- 33 **3.3 ADJUSTING**
34 A. Adjust hardware and moving parts to function smoothly, so that grilles operate easily, free of warp, twist, or
35 distortion.
36 B. Lubricate bearings and sliding parts as recommended by manufacturer.

37 **END OF SECTION**

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SECTION 08 36 13

SECTIONAL DOORS

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
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PART 2 – PRODUCTS

- 2.1 [MANUFACTURERS](#)
- 2.2 [PERFORMANCE REQUIREMENTS](#)
- 2.3 [ALUMINUM DOORS \(OVHD-1\)](#)
- 2.4 [INSULATED SECTIONAL DOOR \(OVHD-2\)](#)
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PART 3 – EXECUTION

- 3.1 [EXAMINATION](#)
- 3.2 [INSTALLATION](#)
- 3.3 [STARTUP SERVICES](#)
- 3.4 [ADJUSTING](#)
- 3.5 [DEMONSTRATION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes electrically operated sectional doors.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports.
 - 3. Section 08 71 00 "Door Hardware" for keyed cylinders.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2. Certification: Construction and installation complies with International Energy Conservation Code (IECC) meeting minimum air Infiltration rates.
- C. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Include diagrams for power, signal, and control wiring.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Flat door sections with sensor edge on bottom section.

1 2. Frame for paneled door sections; of each width of stile and rail required.

2 **1.4 INFORMATIONAL SUBMITTALS**

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

5 **1.5 CLOSEOUT SUBMITTALS**

- 6 A. Maintenance Data: For sectional doors to include in maintenance manuals.

7 **1.6 QUALITY ASSURANCE**

- 8 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
9 manufacturer for both installation and maintenance of units required for this Project.
10 B. Regulatory Requirements: Comply with applicable provisions in [the U.S. Architectural & Transportation
11 Barriers Compliance Board's ADA-ABA Accessibility Guidelines] [and] [ICC A117.1] <Insert requirement>.

12 **PART 2 - PRODUCTS**

13 **2.1 MANUFACTURERS**

- 14 A. Basis-of-Design Product: Subject to compliance with requirements, provide Raynor Garage Doors as
15 specified or comparable product by one of the following:
16 1. Clopay Building Products.
17 2. Rite-Hite Corporation.
18 3. Wayne-Dalton Corp.
19 B. Source Limitations: Obtain sectional doors from single source from single manufacturer.
20 1. Obtain operators and controls from sectional door manufacturer.

21 **2.2 PERFORMANCE REQUIREMENTS**

- 22 A. General Performance: Sectional doors shall comply with performance requirements specified without
23 failure due to defective manufacture, fabrication, installation, or other defects in construction.
24 B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
25 1. Design Wind Load: As indicated on Drawings.
26 2. Testing: According to ASTM E330 or DASMA 108 for garage doors and complying with the
27 acceptance criteria of DASMA 108.
28 3. International Energy Conservation Code (IECC) Requirements: Air Infiltration: Maximum air
29 leakage of 0.24 cfm/ft² is required by using the required header and jamb seals and track
30 mounting. Testing shall be performed in accordance with DASMA 105 test procedure.
31 4. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing
32 permanent deformation or disengagement of door components.
33 a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of the door
34 width.
35 b. Deflection of horizontal track assembly shall not exceed 1/240 of the door height.

36 **2.3 ALUMINUM DOORS (OVHD-1)**

- 37 A. Basis of Design: AlumaView AV200 as manufactured by Raynor Garage Doors:
38 1. Doors:
39 a. Operation: Provide doors designed for electric motor operation.
40 b. Jamb Construction: Steel jambs with self-tapping fasteners.
41 2. Sections:
42 a. Material:
43 1) 2 inches (51mm) thick, 6063-T6 aluminum alloy stiles and rails joined together with
44 5/16 inch (8 mm) diameter screws. Aluminum panels 0.050 inch (1.3 mm) thick or
45 glazing (when specified) fill the spaces between stiles and rails. Combined
46 dimension of two adjoining intermediate meeting rails 3-13/16 inches (97 mm).
47 Bottom rail height 5-1/4 inches (133 mm). Top rail height 3-1/4 inches (83 mm) or 5-
48 1/4 inches (133 mm) as determined by overall door width. End stiles 3-3/8 inches (86
49 mm) or 6-1/2 inches (165 mm) wide as determined by overall door width. Center
50 stiles 3-5/8 inches (92 mm) wide.
51 2) Finish: Anodized.
52 3) Color: Black anodized finish.
53 b. Seals: Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail.

- 1) Bulb-type joint seal between sections.
 - 2) Blade seal on top section to prevent airflow above header.
 - c. Trussing: Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.
 3. Windows: Provide door sections with windows in lieu of 0.050 inch (1.3mm) aluminum filler panels. Locations to comply with door elevation drawings.
 4. Non-Impact Rated Glazing: Provide as follows.
 - a. 1/2 inch (12.69mm) Insulated Low E Tempered Glass consisting of two panes of 1/8 inch (3.2mm) Tempered insulated glass.
 5. Track:
 - a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weather seal.
 - b. Configuration Type: Configuration Type: Normal-Clearance.
 - c. Track Size: Size: 3 inches (76 mm).
 - d. Mounting:
 - 1) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel or masonry jambs. Continuous angle size not less than 3-1/2 inches by 5 inches by 1/8 inches (89 by 127by 3.2 mm) on 3-inch track.
 - e. Finish: White Powder coat.
 6. Counterbalance:
 - a. Counterbalance System: Provided with aircraft-type, galvanized steel lifting cables with minimum safety factor of 5. Torsion Springs consisting of heavy-duty oil-tempered wire torsion springs on a continuous ball-bearing cross-header shaft.
 - 1) Spring Cycle Requirements: Standard 10,000 cycles.
 7. Hardware:
 - a. Hinges and Brackets: Fabricated from galvanized steel.
 - b. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
 - c. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
 - 1) For angle mounted doors provide angle clip-on seal.
 - d. Furnish door system with locks:
 - 1) Interior lock with dead bolt provided to receive keyed cylinder. Interlock with operator.
 - 2) Lock Cylinders: Cylinders specified in Section 08 71 00 "Door Hardware" and keyed to building keying system.
 8. Limited Warranty: Manufacturer warrants the door sections against defects in material and workmanship for five years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for three years from date of delivery to the original purchaser. Manufacturer warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer's full standard limited warranty documentation.
- B. Operator:
1. Basis of Design: Model: Raynor ControlHoist Optima:
 - a. Type: Jackshaft with manual chain hoist.
 - b. Motor Horsepower Rating: Continuous 3/4 HP.
 - c. Electrical Requirements: 115 volt single phase.
 - d. Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, mid stop and lock bar sensor capability.
 - e. Provide three button momentary contact "open-stop", constant pressure on close.

- 1 **2.4 INSULATED SECTIONAL DOOR (OVHD-2)**
- 2 A. Basis of Design: ThermaSeal Series TM220 as manufactured by Raynor Garage Doors:
- 3 1. Doors:
- 4 a. Operation: Provide doors designed for electric motor operation.
- 5 b. Jamb Construction: Steel jambs with self-tapping fasteners.
- 6 2. Sections: Sectional thermal polyurethane insulated sandwich door.
- 7 B. Assembly:
- 8 1. Operation: Provide doors designed for electric motor operation.
- 9 2. Jamb Construction: Steel jambs with self-tapping fasteners.
- 10 3. Structural Performance Requirements:
- 11 a. Wind Loads: Uniform pressure as indicated on Drawings.
- 12 4. International Energy Conservation Code (IECC) Requirements
- 13 a. Air Infiltration – Provide an air leakage rate rating of 0.12 cfm/ft² with manufacturer's IECC
- 14 Compliance Package.
- 15 b. Installed U-factor of 0.19.
- 16 C. Sections:
- 17 1. Sections shall be pressure bonded to injected polyurethane foam insulated core. Hinge
- 18 reinforcement strips shall be 20 gauge galvanized steel, located within section interior. End stiles to
- 19 be 16 gauge galvanized steel.
- 20 2. Material: Steel sandwich construction, 2 inches (51mm) thick, roll formed from commercial quality,
- 21 hot-dipped galvanized (G40 exterior) steel complying with ASTM A 653. Exterior skin shall be
- 22 constructed of 20 gauge steel and interior skin shall be 26 gauge steel with embossed stucco
- 23 texture.
- 24 3. Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
- 25 a. Color: Black polyester paint to match anodized color of OVHD-1.
- 26 4. Insulation: Expanded polyurethane with R-value of 18.3.
- 27 5. Seals: Interior and exterior skins to be separated by continuous hot melt to form thermal break and
- 28 complete weatherseal along section joint. Bottom of door to have flexible U-shaped vinyl seal
- 29 retained in aluminum rail. Optional dual-durometer vinyl blade seal on top section to prevent airflow
- 30 above header
- 31 6. Trussing: Doors designed to withstand specified wind load. Deflection of door in horizontal position
- 32 to be maximum of 1/120th of door width.
- 33 D. Mounting: Sections mounted in door opening as indicated on drawings
- 34 E. Track:
- 35 1. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door
- 36 to jamb or weatherseal.
- 37 2. Configuration Type: Low Headroom.
- 38 3. Track Size: 3 inches (76 mm).
- 39 4. Mounting:
- 40 a. Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past
- 41 header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous
- 42 angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-
- 43 inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
- 44 5. Finish: White Powdercoat.
- 45 F. Counterbalance:
- 46 1. Counterbalance System: Provided with aircraft-type, galvanized steel lifting cables with minimum
- 47 safety factor of 5. Torsion Springs consisting of heavy-duty oil-tempered wire torsion springs on a
- 48 continuous ball-bearing cross-header shaft.
- 49 a. Spring Cycle Requirements: Standard 10,000 cycles.
- 50

- 1 G. Hardware:
- 2 1. Hinges and Brackets: Fabricated from galvanized steel.
- 3 2. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball
- 4 bearings.
- 5 3. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather
- 6 stripping shall be replaceable.
- 7 a. For angle mounted doors provide angle clip-on seal.
- 8 4. Furnish door system with locks:
- 9 a. Interior lock with dead bolt provided to receive keyed cylinder. Interlock with operator.
- 10 b. Lock Cylinders: Cylinders specified in Section 08 71 00 "Door Hardware" and keyed to
- 11 building keying system.
- 12 H. Limited Warranty: Manufacturer warrants the door sections against defects in material and workmanship,
- 13 and deterioration due to rust-through for ten years from date of delivery to the original purchaser.
- 14 Manufacturer also warrants the door sections against delamination of the insulation from the steel skins for
- 15 ten years from date of delivery to the original purchaser. Window components are warranted against
- 16 defects in material and workmanship for one year from date of delivery to the original purchaser.
- 17 Manufacturer warrants all hardware and spring components against defects in material and workmanship
- 18 for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited
- 19 Warranty requirements in accordance with manufacturer's full standard limited warranty documentation.

20 **2.5 OPERATOR**

- 21 A. Basis of Design: ControlHoist as manufactured by Raynor Garage Doors:
- 22 1. Type: Jackshaft.
- 23 2. Motor Horsepower Rating: Continuous 1/2 HP.
- 24 3. Electrical Requirements: 115 volt single phase.
- 25 4. Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse,
- 26 external radio control hook-up and maximum run timer. Provisions for timers to close, monitored
- 27 reversing devices, mid stop and lock bar sensor capability.
- 28 5. Provide three button momentary contact "open-stop", constant pressure on close.

29 **2.6 GENERAL FINISH REQUIREMENTS**

- 30 A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in
- 31 appearance of adjoining components are acceptable if they are within the range of approved Samples and
- 32 are assembled or installed to minimize contrast.

33 **PART 3 - EXECUTION**

34 **3.1 EXAMINATION**

- 35 A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for
- 36 substrate construction and other conditions affecting performance of the Work.
- 37 B. Examine locations of electrical connections.
- 38 C. Proceed with installation only after unsatisfactory conditions have been corrected.

39 **3.2 INSTALLATION**

- 40 A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts,
- 41 hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- 42 B. Tracks:
- 43 1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24 inches
- 44 apart.
- 45 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers
- 46 attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and
- 47 reinforcement as required for rigid installation of track and door-operating equipment.
- 48 C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with
- 49 regulatory requirements for accessibility.
- 50 D. Power-Operated Doors: Install according to UL 325.
- 51

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [PREINSTALLATION MEETINGS](#)
- 1.4 [ACTION SUBMITTALS](#)
- 1.5 [INFORMATIONAL SUBMITTALS](#)
- 1.6 [CLOSEOUT SUBMITTALS](#)
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PART 2 – PRODUCTS

- 2.1 [PERFORMANCE REQUIREMENTS](#)
- 2.2 [MANUFACTURERS](#)
- 2.3 [INTERIOR STOREFRONT FRAMING \(STFT-1,-2\)](#)
- 2.4 [ENTRANCE DOOR SYSTEMS](#)
- 2.5 [ENTRANCE DOOR HARDWARE](#)
- 2.6 [GLAZING](#)
- 2.7 [FABRICATION](#)
- 2.8 [ALUMINUM FINISHES](#)

PART 3 – EXECUTION

- 3.1 [INSTALLATION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior storefront framing.
 - 2. Interior manual-swing entrance doors and door-frame units.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 1. Section 08 71 00 "Door Hardware".
 - 2. Section 08 80 00 – Glazing: for IG units required for curtainwalls.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For sealants, indicating VOC content.
 - 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
 - 3. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content with a sample document illustrating project specific information that will be provided after product shipment.
 - 4. Material Ingredient Reporting: Shall have a complete list of chemical ingredients to at least 100ppm (0.01%) that covers 100% of the product, acceptable documentation includes:
 - a. Manufacturer's inventory with Chemical Abstract Service Registration Number (CASRN or CAS#).
 - 1) Material Transparency Summary (MTS).
 - b. Cradle to Cradle certification: Either document below is acceptable for this option.
 - 1) Cradle to Cradle Certified™ with Material Health section Silver or above.
 - 2) Silver level or above Material Health Certificate.
 - c. Red List Free DECLARE label.

- 1 a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of
- 2 1.57 lbf/sq. ft.
- 3 b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of
- 4 1.57 lbf/sq. ft.
- 5 3. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

6 2.2 MANUFACTURERS

- 7 A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may
- 8 be incorporated into the Work include, but are not limited to the following:
- 9 1. EFCO Corporation.
- 10 2. Kawneer North America.
- 11 3. Tubelite Inc.

12 2.3 INTERIOR STOREFRONT FRAMING (STFT-1, -2))

- 13 A. Interior: **STFT-1**.
- 14 1. Basis of Design: Kawneer North America; Trifab 451 Non-thermal Framing System – 2 inches x 4-1/2
- 15 inches nominal dimension; Non-Thermal; Center Weatherseal Glazed (Type B); Screw Spline, Shear
- 16 Block or Stick Fabrication.
- 17 B. Exterior: **STFT-2**.
- 18 1. Basis of Design: Trifab VG 451T Framing System – 2 inches x 4-1/2 inches nominal dimension;
- 19 Thermal; Front Weatherseal Glazed (Type B); Screw Spline, Shear Block, Stick or Punched Opening
- 20 Fabrication.
- 21 C. Exterior: **STFT-3**.
- 22 1. Basis of Design: Trifab 601 Framing System – 2 inches x 6 inches nominal dimension; Non-thermal;
- 23 Center Glazed (Type B); Screw Spline, Shear Block, Stick or Punched Opening Fabrication.
- 24 D. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required
- 25 and reinforced as required to support imposed loads.
- 26 1. Glazing System: Retained mechanically with gaskets on four sides.
- 27 2. Finish: Black Anodized.
- 28 3. Fabrication Method: Field-fabricated stick system.
- 29 E. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral,
- 30 where framing abuts adjacent construction.
- 31 F. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining,
- 32 nonferrous shims for aligning system components.
- 33 G. Materials:
- 34 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
- 35 a. Sheet and Plate: ASTM B 209.
- 36 b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- 37 c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
- 38 d. Structural Profiles: ASTM B 308/B 308M.
- 39 2. Finish: Black anodized.

40 2.4 ENTRANCE DOOR SYSTEMS

- 41 A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
- 42 1. Basis of Design: 350T Insulpour™ Thermal Entrances as manufactured by Kawneer North America.
- 43 2. Door Construction: 2-1/4-inches overall thickness, with minimum 0.125-inch-thick, extruded-aluminum
- 44 tubular rail and stile members. Door corner construction shall consist of mechanical clip fastening,
- 45 SIGMA deep penetration plug welds and 1 inch long fillet welds inside and outside of all four corners.
- 46 Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
- 47 3. Thermally Broken entrance Framing - Thermal Break with a 1/4 inch (6.4 mm) separation consisting
- 48 of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively
- 49 joined to aluminum storefront sections.
- 50 a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance
- 51 with AAMA 505.
- 52 4. Recycled Content: Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
- 53 5. Door Design: Medium style. 3-1/2 inches stile and top rail. 10 inches bottom rail. Coordinate with
- 54 hardware space requirement.
- 55 6. Finish: AA-M10C21A44 / AA-M45C22A44, AAMA 611, Architectural Class I Color Anodic Coating
- 56 (Color Black to match framing)
- 57 7. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
- 58 a. Provide non-removable glazing stops on outside of door.

- 1 8. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position,
2 the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 1.57
3 psf (75 Pa) for pairs of doors. A single 3 feet x 7 feet (915 mm x 2134 mm) entrance door and frame
4 shall not exceed 1.0 cfm per square foot. A pair of 6 feet x 7 feet (1830 mm x 2134 mm) entrance
5 doors and frame shall not exceed 1.0 cfm per square foot

6 **2.5 ENTRANCE DOOR HARDWARE**

- 7 A. Entrance Door Hardware: Hardware required for this Section is specified in Section 08 71 00 "Door
8 Hardware."

9 **2.6 GLAZING**

- 10 A. Spandrel Panels (**ALUM-1**):
11 1. Basis of Design: Mapes Mapeshape Infill Panel panel.
12 2. Isocyanurate core on hardboard substrate with interior and exterior facers of Standard .032
13 aluminum anodized finish to match curtainwall framing.
14 3. Refer to drawings for thickness and dimensions.
15 B. Glazing: Comply with Section 08 80 00 "Glazing."
16 C. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient
17 elastomeric glazing gaskets, setting blocks, and shims or spacers.
18 D. Glazing Sealants: As recommended by manufacturer.
19 1. Sealant shall have a VOC content of 250 g/L or less.

20 **2.7 FABRICATION**

- 21 A. Form or extrude aluminum shapes before finishing.
22 B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish.
23 Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
24 C. Fabricate components that, when assembled, have the following characteristics:
25 1. Profiles that are sharp, straight, and free of defects or deformations.
26 2. Accurately fitted joints with ends coped or mitered.
27 3. Physical and thermal isolation of glazing from framing members.
28 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required
29 glazing edge clearances.
30 5. Provisions for field replacement of glazing from exterior.
31 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
32 D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
33 E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing
34 entrance door hardware.
35 F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
36 G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible.
37 Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
38 H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

39 **2.8 ALUMINUM FINISHES**

- 40 A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
41 1. Color: Black.
42 2. Color: Match Architect's sample.

43 **PART 3 - EXECUTION**

44 **3.1 INSTALLATION**

- 45 A. General:
46 1. Comply with manufacturer's written instructions.
47 2. Do not install damaged components.
48 3. Fit joints to produce hairline joints free of burrs and distortion.
49 4. Rigidly secure nonmovement joints.
50 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration
51 and to prevent impeding movement of moving joints.
52 6. Seal perimeter and other joints watertight unless otherwise indicated.
53 B. Metal Protection:

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SECTION 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

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25 **PART 1 - GENERAL**

26 **1.1 RELATED DOCUMENTS**

- 27 A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and
28 Division 01 Specification Sections, apply to this Section.
29 B. Related Requirements:
30 1. Section 01 81 13.14 “Sustainable Design Requirements” for submittal and product requirements.

31 **1.2 SUMMARY**

- 32 A. Section includes glazed aluminum curtain walls.
33 B. Related Requirements:
34 1. Section 01 81 13.14 “Sustainable Design Requirements” for submittal and product requirements.
35 2. Section 08 71 00 “Door Hardware”.
36 3. Section 08 80 00 – Glazing: for IG units required for curtainwalls.

37 **1.3 PREINSTALLATION MEETINGS**

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

39 **1.4 ACTION SUBMITTALS**

- 40 A. Product Data: For each type of product.
41 B. Sustainable Design Submittals:
42 1. Product Data: For sealants, indicating VOC content.
43 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting
44 materials.
45 3. Recycled Content:
46 a. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer
47 recycled content with a sample document illustrating project specific information that will be
48 provided after product shipment.
49 b. Once product has shipped, provide project specific recycled content information, including:
50 1) Indicate recycled content; indicate percentage of pre- and post-consumer recycled
51 content per unit of product.
52 2) Indicate relative dollar value of recycled content product to total dollar value of product
53 included in project.
54 3) Indicate location recovery of recycled content.

- 1 4) Indicate location of manufacturing facility.
2
3 4. Material Ingredient Reporting: Shall have a complete list of chemical ingredients to at least 100ppm
4 (0.01%) that covers 100% of the product, acceptable documentation includes:
5 a. Manufacturer's inventory with Chemical Abstract Service Registration Number (CASRN or
6 CAS#).
7 1) Material Transparency Summary (MTS).
8 b. Cradle to Cradle certification: Either document below is acceptable for this option.
9 1) Cradle to Cradle Certified™ with Material Health section Silver or above.
10 2) Silver level or above Material Health Certificate.
11 c. Red List Free DECLARE label.
12 d. Environmental Product Declarations (EPD): Shall have a Type III Product-Specific EPD.
13 C. Shop Drawings: Include plans, elevations, sections, full-size details, and attachments to other work.
14 1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
15 D. Samples: For each exposed finish required.
16 E. Delegated-Design Submittal: For glazed aluminum curtain walls and canopy system indicated to comply with
17 performance requirements and design criteria, including analysis data signed and sealed by the qualified
professional engineer responsible for their preparation.

18 **1.5 INFORMATIONAL SUBMITTALS**

- 19 A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.
20 B. Product test reports.
21 C. Field quality-control reports.
22 D. Sample warranties.

23 **1.6 CLOSEOUT SUBMITTALS**

- 24 A. Maintenance data.

25 **1.7 QUALITY ASSURANCE**

- 26 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
27 manufacturer.
28 B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
29 C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic
30 effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions,
31 arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one
32 another, and to adjoining construction.
33 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's
34 approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.
35 D. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete a
36 mockup submittal for review.

37 **1.8 WARRANTY**

- 38 A. Special Assembly Warranty: Installer agrees to repair or replace components of glazed aluminum curtain
39 wall that do not comply with requirements or that fail in materials or workmanship within specified warranty
40 period.
41 1. Warranty Period: 10 years from date of Substantial Completion.
42 B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum
43 that shows evidence of deterioration of factory-applied finishes within specified warranty period.
44 1. Warranty Period: 2 years from date of Substantial Completion.
45

1 **PART 2 - PRODUCTS**

2 **2.1 PERFORMANCE REQUIREMENTS (CWALL-1)**

- 3 A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality
4 Requirements," to design glazed aluminum curtain walls.
- 5 B. General Performance: Comply with performance requirements specified, as determined by testing of glazed
6 aluminum curtain walls representing those indicated for this Project without failure due to defective
7 manufacture, fabrication, installation, or other defects in construction.
- 8 1. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not
9 limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly
10 distributed and concentrated live loads.
- 11 2. Failure also includes the following:
- 12 a. Thermal stresses transferring to building structure.
- 13 b. Glass breakage.
- 14 c. Noise or vibration created by wind and thermal and structural movements.
- 15 d. Loosening or weakening of fasteners, attachments, and other components.
- 16 e. Failure of operating units.
- 17 C. Structural Loads:
- 18 1. Wind Loads: As indicated on Drawings.
- 19 2. Other Design Loads: As indicated on Drawings.
- 20 D. Deflection of Framing Members: At design wind pressure, as follows:
- 21 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane
22 not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that
23 restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
- 24 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing
25 bite to less than 75 percent of design dimension and that which reduces edge clearance between
26 framing members and glazing or other fixed components to less than 1/8 inch.
- 27 a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and
28 operable units.
- 29 3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
- 30 a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4-inch for spans
31 greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.
- 32 E. Structural: Test according to ASTM E 330 as follows:
- 33 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence
34 deflection exceeding specified limits.
- 35 2. Uniform Load: A static air design load of 150 percent of positive and negative wind-load design
36 pressures shall be applied in the positive and negative direction in accordance with ASTM E 330.
37 There shall be no deflection in excess of L/175 of the span of any framing member at design load.
38 At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent
39 set in the framing members in excess of 0.2% of their clear spans shall occur.
- 40 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- 41 F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
- 42 1. Fixed Framing and Glass Area:
- 43 a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
- 44 G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
- 45 1. No evidence of water penetration through fixed glazing and framing areas when tested according to
46 a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but
47 not less than 12 psf (575 Pa).
- 48 2. Water Resistance, (dynamic): The test specimen shall be tested in accordance with AAMA 501.1.
49 There shall be no leakage at an air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.
- 50 H. Energy Performance: Certify and label energy performance according to NFRC as follows:
- 51 1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more
52 than 0.45 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
- 53 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient
54 of no greater than 0.30 as determined according to NFRC 200.
- 55 3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified
56 condensation resistance rating of no less than 63 as determined according to AAMA Specification
57 1503.
- 58 I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature
59 changes:
- 60 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1 **2.2 MANUFACTURERS**

- 2 A. Basis of Design: Kawneer 1600 Wall System 1 with 4 Sided Captured curtain wall system.
3 1. 2-1/2 inches x 7-1/2 inches (63.5 x 191) outside glazed captured format.
4 B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may
5 be incorporated into the Work include, but are not limited to the following:
6 1. EFCO Corporation.
7 2. Kawneer North America; an Alcoa company.
8 3. Oldcastle, Inc.
9 4. Tubelite Inc.
10 5. Wausau Window and Wall Systems; Apogee Wausau Group.

11 **2.3 FRAMING**

- 12 A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required
13 and reinforced as required to support imposed loads.
14 1. Construction: Thermally broken.
15 2. Glazing System: Retained mechanically with gaskets at perimeter.
16 3. Glazing Plane: Front.
17 4. Finish: High-performance anodized finish.
18 5. Fabrication Method: Field-fabricated stick system.
19 B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing at
20 perimeter and at transoms.
21 1. Include snap-on aluminum trim that conceals fasteners.
22 C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining,
23 nonferrous shims for aligning system components.
24 D. Materials:
25 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
26 a. Recycled Content: Minimum of 50% mixed pre- and post-consumer recycled content.
27 b. Sheet and Plate: ASTM B 209.
28 c. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
29 d. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
30 e. Structural Profiles: ASTM B 308/B 308M.
31 2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with
32 SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select
33 surface preparation methods according to recommendations in SSPC-SP COM, and prepare
34 surfaces according to applicable SSPC standard.
35 a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
36 b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
37 c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

38 **2.4 ENTRANCE DOOR SYSTEMS**

- 39 A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
40 1. Basis of Design: 350T Insulpour™ Thermal Entrances as manufactured by Kawneer North America.
41 2. Door Construction: 2-1/4-inches overall thickness, with minimum 0.125-inch-thick, extruded-aluminum
42 tubular rail and stile members. Door corner construction shall consist of mechanical clip fastening,
43 SIGMA deep penetration plug welds and 1 inch long fillet welds inside and outside of all four corners.
44 Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
45 3. Thermally Broken entrance Framing - Thermal Break with a 1/4 inch (6.4 mm) separation consisting
46 of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively
47 joined to aluminum storefront sections.
48 a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance
49 with AAMA 505.
50 4. Recycled Content: Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
51 5. Door Design: Medium style. 3-1/2 inches stile and top rail. 10 inches bottom rail. Coordinate with
52 hardware space requirement.
53 6. Finish: AA-M10C21A44 / AA-M45C22A44, AAMA 611, Architectural Class I Color Anodic Coating
54 (Color Black to match framing)
55 7. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
56 a. Provide non-removable glazing stops on outside of door.
57

- 1 8. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position,
2 the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 1.57 psf
3 (75 Pa) for pairs of doors. A single 3 feet x 7 feet (915 mm x 2134 mm) entrance door and frame shall
4 not exceed 1.0 cfm per square foot. A pair of 6 feet x 7 feet (1830 mm x 2134 mm) entrance doors
5 and frame shall not exceed 1.0 cfm per square foot

6 **2.5 ENTRANCE DOOR HARDWARE**

- 7 A. Entrance Door Hardware: Hardware required for this Section is specified in Section 08 71 00 "Door
8 Hardware."

9 **2.6 GLAZING**

- 10 A. Spandrel Panels (**ALUM-1**):
11 1. Basis of Design: Mapes Mapeshape Infill Panel panel.
12 2. Isocyanurate core on hardboard substrate with interior and exterior facers of Standard .032
13 aluminum anodized finish to match curtainwall framing.
14 3. Refer to drawings for thickness and dimensions.
15 B. Glazing: Comply with Section 08 80 00 "Glazing."
16 C. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient
17 elastomeric glazing gaskets, setting blocks, and shims or spacers.
18 D. Glazing Sealants: As recommended by manufacturer.
19 1. Sealant shall have a VOC content of 250 g/L or less.

20 **2.7 OUTSWING CASEMENT WINDOW (WNDW-1)**

- 21 A. Basis of Design: GLASSvent UT Windows (Structural Silicone Glazed) as manufactured by Kawneer North
22 America; an Alcoa company.
23 1. Model: 5-1/8 inches (130.2 mm) Overall System Depth.
24 2. Performance: AW-PG90-C (with 3-Cam handles).
25 3. Color: Match curtainwall
26 B. Window Performance Requirements:
27 1. General Performance: Aluminum-framed window system shall withstand the effects of the following
28 performance requirements without failure due to defective manufacture, fabrication, installation, or
29 other defects in construction.
30 2. Performance Requirements: Provide aluminum windows of performance indicated that comply with
31 AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS). Performance Class and Grade;
32 a. Outswing Casement Windows: AW-PG90-C (with 3-Cam handles)
33 3. Air leakage: The test specimen shall be tested in accordance with ASTM E283. Air leakage rate shall
34 not exceed 0.10 cfm/ft² at a static air pressure differential of 6.2 psf (300 Pa). The test specimen
35 shall meet the A3 rating of less than 0.55 (m³/h)/m at 1.6 psf (75 Pa) when tested in accordance
36 with CAN/CSA-A440-00 Windows.
37 4. Water Resistance: The test specimen shall be tested in accordance with ASTM E547 and ASTM
38 E331. There shall be no leakage as defined in the test method at a static air pressure differential of
39 12 psf (575 Pa). The test specimen shall meet the B7 rating with no water leakage at 12 psf (575
40 Pa) when tested in accordance with CAN/CSA-A440-00 Windows;
41 5. Uniform Load Deflection: A minimum static air pressure difference 90 psf (4309 Pa) shall be applied
42 in the positive and negative direction in accordance with ASTM E330. There shall be no deflection
43 in excess of L/175 of the span of any framing member. The test specimen shall meet the C3, C4 or
44 C5 rating when tested in accordance with CAN/CSA-A440-00 Windows.
45 6. Uniform Load Structural: A minimum static air pressure difference of 105 psf (5027 Pa) shall be
46 applied in the positive and negative direction in accordance with ASTM E330. The unit shall be
47 evaluated after each load with permanent set not to exceed 0.3% of span length.
48 7. Uniform Load Structural: A minimum static air pressure difference of 135 psf (6464 Pa) shall be
49 applied in the positive and negative direction in accordance with ASTM E330. The unit shall be
50 evaluated after each load with permanent set not to exceed 0.2% of span length.
51 8. Component Testing: Window components shall be tested in accordance with procedures described
52 in AAMA/WDMA/CSA 101/I.S.2/A440 and AAMA 910.
53

- 1 9. Energy Efficiency:
 - 2 a. Thermal Transmittance (U-Factor): When tested to AAMA Specification 1503, AAMA
 - 3 Specification 507 or NFRC 100 the thermal transmittance (U-Factor) shall not be more than;
 - 4 1) 1 inch (25.4 mm) insulating glass:
 - 5 a) U-Factor not more than .56 BTU/hr/ft²/°F per AAMA 1503 with exterior 3/16
 - 6 inch (4.76 mm) clear glass, aluminum spacer, and interior 3/16 inch (4.76 mm)
 - 7 glass.
 - 8 10. Condensation Resistance Test (CRF): Provide aluminum windows tested for thermal performance
 - 9 according to AAMA 1503, the condensation resistance factor (CFR) shall not be less than;
 - 10 a. 1 inch (25.4 mm) clear insulating glass with aluminum spacer:
 - 11 1) CRF not less than 73 (frame) and 60 (glass).
 - 12 11. Temperature Index (I): Provide aluminum windows tested for thermal performance according to
 - 13 CSA-A440 with a Temperature Index (I) not less than:
 - 14 a. 1 inch (25.4 mm) clear insulating glass with aluminum spacer:
 - 15 1) Project-Out: (I) not less than 68 (frame) and 61 (glass).
 - 16 12. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested in
 - 17 accordance with AAMA Specification 1801, the STC and OITC shall not be less than;
 - 18 a. 1 inch (25.4 mm) insulating glass made with exterior 3/16 inch (4.76 mm) clear glass, 3/8 inch
 - 19 (9.52 mm) aluminum spacer, and interior 7/16 inch (11.11 mm) laminated clear glass:
 - 20 1) STC not less than 37; OITC not less than 30.
 - 21 13. Forced Entry Resistance: All windows shall conform to ASTM F588, Grade 10.
 - 22 14. Recycled Content: Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
 - 23 15. Environmental Product Declarations (EPD): Shall have a Type III Product-Specific EPD created from
 - 24 a Product Category Rule.
 - 25 16. Material Ingredient Reporting: Shall have a complete list of chemical ingredients to at least 100ppm
 - 26 (0.01%) that covers 100% of the product, acceptable documentation includes:
 - 27 a. Manufacturer's inventory with Chemical Abstract Service Registration Number (CASRN or
 - 28 CAS#).
 - 29 1) Material Transparency Summary (MTS).
 - 30 b. Cradle to Cradle certification: Either document below is acceptable for this option.
 - 31 1) Cradle to Cradle Certified with Material Health section Silver or above.
 - 32 2) Silver level or above Material Health Certificate.
 - 33 c. Red List Free DECLARE label.
 - 34 C. Materials:
 - 35 1. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for
 - 36 strength, corrosion resistance, and application of required finish and not less than 0.090" (2.3 mm)
 - 37 wall thickness at any location for the main frame and sash members.
 - 38 2. Thermal Barrier: The thermal barrier shall be Kawneer consisting of low conductive polymer full
 - 39 depth of infill.
 - 40 3. Fasteners: Nonmagnetic stainless steel or other materials to be non-corrosive and compatible with
 - 41 aluminum window members, trim, hardware, anchors, and other components.
 - 42 4. Anchors: Nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for
 - 43 SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
 - 44 5. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard,
 - 45 permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer
 - 46 for joint size and movement.
 - 47 D. Glazing:
 - 48 1. Glazing System: Glazing method shall be four sided structural silicone glazed in accordance with
 - 49 manufacturer's standards.
 - 50 E. Hardware:
 - 51 1. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or
 - 52 other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly
 - 53 close, and securely lock aluminum windows, and sized to accommodate sash weight and
 - 54 dimensions.
 - 55 2. Project-Out / Outswing Casement Windows: Provide the following operating hardware:
 - 56 a. Stainless Steel 4-Bar Hinges
 - 57 b. Cast White Bronze Cam Locking Handles.
 - 58 F. Accessories:
 - 59 1. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, non-
 - 60 migrating types in hardness recommended by manufacturer, compatible with sealants, and suitable
 - 61 for system performance requirements.
 - 62 2. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.

- 1 3. Sealants and joint fillers for joints at perimeter of window system as specified in Division 7 Section
2 "Joint Sealants".
3 4. Insect Screens: Extruded aluminum frames, 6063-T5 or 6063-T6 alloy and temper, joined at corners:
4 18 x 16 mesh fiberglass screen cloth; frames finished to match aluminum windows; splines shall be
5 extruded vinyl, removable to permit rescreening.
6 G. Fabrication:
7 1. Framing Members, General: Fabricate components that, when assembled, have the following
8 characteristics:
9 a. Profiles that are sharp, straight, and free of defects or deformations.
10 b. Accurately fit joints; make joints flush, hairline and weatherproof.
11 c. Means to drain water passing joints, condensation within framing members, and moisture
12 migrating within the system to exterior.
13 d. Physical and thermal isolation of glazing from framing members.
14 e. Accommodations for thermal and mechanical movements of glazing and framing to maintain
15 required glazing edge clearances.
16 f. Provisions for field replacement of glazing.
17 g. Fasteners, anchors, and connection devices that are concealed from view to greatest extent
18 possible.
19 2. Window Vent and/or Vent Frame Joinery: Mitered and mechanically clipped and/or staked. Factory
20 sealed vent and /or vent frame and corner joints.
21 3. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling
22 components and anchoring windows.

23 2.8 **CANOPY**

- 24 A. Glazed Canopy Overhang (**CNPY-1**)
25 1. Basis of Design: Delegated design by CWALL-1 manufacturer per design intent of drawings.
26 2. Color: Black Anodized To Match Curtainwall.
27 3. Outrigger Span: 30 Inches.
28 4. Depth: Refer to Drawings.
29 5. Outrigger Shape: Refer to Drawings.
30 B. Delegated Design:
31 1. Combined load on sunshade configurations to be determined in accordance with ASCE 7 or
32 applicable code requirements. Combined load consists of wind, snow and ice loads.
33 2. The assembled sunshade shall be capable of supporting the specified combined load without
34 damage, permanent deformation, or disengagement from the glazed system mullion.
35 3. Stresses resulting from thermal expansion/contraction, shall not cause permanent deformation of
36 sunshade assemblies or disengagement from the glazed system.
37 C. Materials:
38 1. Thermal Barrier: When applied on a thermally broken captured system, sunshade shall be thermally
39 isolated from the interior aluminum mullions by a nominal 0.25 inch thick low conductance material.
40 2. Aluminum sheet alloy: Shall meet the requirements of ASTM B209.
41 3. Sealant: For sealants required within fabricated sunshade system, provide permanently elastic, non-
42 shrinking, and non-migrating type recommended by sealant manufacturer for joint size and
43 movement.
44 4. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of
45 glazed curtain wall members shall be nominal and in compliance with AA Aluminum Standards and
46 Data.

47 2.9 **FABRICATION**

- 48 A. Form or extrude aluminum shapes before finishing.
49 B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish.
50 Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
51 C. Fabricate components that, when assembled, have the following characteristics:
52 1. Profiles that are sharp, straight, and free of defects or deformations.
53 2. Accurately fitted joints with ends coped or mitered.
54 3. Physical and thermal isolation of glazing from framing members.
55 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain
56 required glazing edge clearances.
57 5. Provisions for field replacement of glazing from exterior.
58 6. Provisions for safety railings mounted on interior face of mullions or between mullions at interior.
59 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent
60 possible.

- 1 D. Fabricate components to resist water penetration as follows:
2 1. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side
3 of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.
4 E. Factory-Assembled Frame Units:
5 1. Rigidly secure nonmovement joints.
6 2. Prepare surfaces that are in contact structural sealant according to sealant manufacturer's written
7 instructions to ensure compatibility and adhesion.
8 3. Preparation includes, but is not limited to, cleaning and priming surfaces.
9 4. Seal joints watertight unless otherwise indicated.
10 5. Install glazing to comply with requirements in Section 08 80 00 "Glazing."
11 F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

12 **2.10 ALUMINUM FINISHES**

- 13 A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
14 1. Color: Black.
15 2. Color: Match Architect's sample.

16 **PART 3 - EXECUTION**

17 **3.1 INSTALLATION**

- 18 A. General:
19 1. Comply with manufacturer's written instructions.
20 2. Do not install damaged components.
21 3. Fit joints to produce hairline joints free of burrs and distortion.
22 4. Rigidly secure non-movement joints.
23 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration
24 and to prevent impeding movement of moving joints.
25 6. Where welding is required, weld components in concealed locations to minimize distortion or
26 discoloration of finish. Protect glazing surfaces from welding.
27 7. Seal joints watertight unless otherwise indicated.
28 B. Metal Protection:
29 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting
30 contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as
31 recommended by manufacturer for this purpose.
32 2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact
33 surfaces with bituminous paint.
34 C. Install components to drain water passing joints, condensation occurring within framing members, and
35 moisture migrating within glazed aluminum curtain wall to exterior.
36 D. Install components plumb and true in alignment with established lines and grades.
37 E. Install glazing as specified in Section 08 80 00 "Glazing."

38 **3.2 FIELD QUALITY CONTROL**

- 39 A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
40 B. Test Area: Perform tests on representative areas of glazed aluminum curtain walls.
41 C. Field Quality-Control Testing: Perform the following test on representative areas of glazed aluminum curtain
42 walls.
43 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect
44 shall be tested according to AAMA 501.2 and shall not evidence water penetration.
45 a. Perform a minimum of two tests in areas as directed by Architect.
46 D. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
47 E. Prepare test and inspection reports.

48 **END OF SECTION**

SECTION 08 61 00

ROOF WINDOWS

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Venting (with operable sash) roof windows.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 08 80 00 "Glazing" for glass and fabrication requirements for glazing components of roof windows.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for roof windows.
- B. Shop Drawings: For roof windows.
 - 1. Include plans, elevations, sections, and installation details.
 - 2. Include diagrams for power, signal, and control wiring for motorized operation.
- C. Samples for Initial Selection: For units with factory-applied finishes.
 - 1. Include Samples of hardware and accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each roof windows, for comprehensive tests performed by a qualified testing agency.
- B. Sustainability:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
- C. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roof windows and accessories to include in maintenance manuals.

1 **1.6 QUALITY ASSURANCE**

2 A. Manufacturer Qualifications: A manufacturer capable of fabricating roof windows that meet or exceed
3 performance requirements indicated, and of documenting this performance by test reports and
4 calculations.

5 **1.7 DELIVERY, STORAGE, AND HANDLING**

6 A. Protect roof windows during transit, storage, and handling to prevent damage, soiling, and deterioration.
7 Store off ground and covered in a clean, dry, well-ventilated, protected space. Comply with manufacturer's
8 written instructions.

9 **1.8 WARRANTY**

10 A. Special Warranty: Manufacturer agrees to repair or replace roof windows that fail in materials or
11 workmanship within specified warranty period.

- 12 1. Failures include, but are not limited to, the following:
 - 13 a. Failure to meet performance requirements.
 - 14 b. Structural failures, including excessive deflection.
 - 15 c. Water leakage.
 - 16 d. Faulty operation of sashes and hardware.
 - 17 e. Deterioration of materials and finishes beyond normal weathering.
 - 18 f. Deterioration of insulating-glass units, including failure of hermetic seal under normal use
19 that is not attributed to glass breakage or to maintaining and cleaning insulating-glass units
20 contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision
21 by dust, moisture, or film on interior surfaces of glass.
 - 22 g. Deterioration of laminated-glass lites, including defects developed from normal use that are
23 not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to
24 manufacturer's written instructions. Defects include edge separation, delamination that
25 materially obstructs vision through glass, and blemishes exceeding those allowed by
26 referenced laminated-glass standard.
- 27 2. Warranty Period:
 - 28 a. Roof Window: Five years from date of Substantial Completion.
 - 29 b. Insulating-Glass Units: 20 years from date of Substantial Completion.
 - 30 c. Accessories and Electronic Controls: Five years from date of Substantial Completion.
 - 31 d. Hail Breakage Glass Warranty: 10 years from date of Substantial Completion.

32 **PART 2 - PRODUCTS**

33 **2.1 PERFORMANCE REQUIREMENTS**

- 34 A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards
35 of performance, materials, components, accessories, and fabrication unless more stringent requirements
36 are indicated.
 - 37 1. Window Certification: WDMA certified, with label attached to each roof window.
- 38 B. Minimum Performance Grade: AAMA/WDMA/CSA 101/I.S.2/A440 PG45.
- 39 C. Thermal Transmittance: NFRC 100 maximum whole-unit U-factor of 0.55 Btu/sq. ft. x h x deg F.
- 40 D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.
- 41 E. Outside-Inside Transmission Class (OITC): Rated for not less than 28 OITC when tested for laboratory
42 sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.
- 43 F. Exterior Fire-Test Exposure: Provide roof windows identical to those of assemblies tested for Class B fire
44 resistance according to ASTM E 108 or UL 790 by Underwriters Laboratories, Inc. or another testing and
45 inspecting agency acceptable to authorities having jurisdiction.

46 **2.2 ROOF WINDOWS (SKY-1)**

- 47 A. Basis-of-Design Product: Subject to compliance with requirements, provide Velux Solar Powered Fresh Air
48 Skylight Model VCE or comparable product by one of the following:
 - 49 1. Dome'l Inc.
 - 50 2. Wasco.
- 51 B. Description – General:
 - 52 1. Top hung ventilated curb mounted skylights consisting of six integrated components – an interior
53 condensation drainage gasket, an insulating glass unit, an interior window-grade rigid poly-vinyl
54 chloride thermoplastic (PVC) white frame and sash; electric, and solar operator; exterior
55 maintenance-free metal cladding/counter flashing.

- 1 2. Fabrication: Ridgelight 20-40 with 1000 mm by 2200 mm fixed grid.
- 2 C. Curb/Frame:
- 3 1. Flashing: manufacturer's standard for application.
- 4 D. Sash: Polyvinyl.
- 5 E. Insulating-Glass Units: ASTM E 2190.
- 6 1. Basis of Design: Velux "Clean, Quiet & Safe glass (xx04)" Dual pane laminated glass with Neat®
- 7 glass exterior lite.
- 8 2. Exterior Lite: Fully tempered glass with Low-E coating. Neat® glass on exterior lite.
- 9 3. Interior Lite: Laminated glass; heat-strengthened glass with 0.090-inch polyvinyl butyral interlayer.
- 10 4. Filling: Fill space between glass lites with air.
- 11 5. Refer to Section 08 80 00 "Glazing" for glass and construction requirements.
- 12 F. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- 13 G. Operating Hardware:
- 14 1. Hardware Finish: Manufacturer's standard.
- 15 2. Operators and Controls: Gear-type rotary operator with manufacturer's standard control device with
- 16 latching/locking mechanism.
- 17 a. Remote-Control Motor Operator: Manufacturer's standard for operating venting units that
- 18 are more than 72 inches above floor.
- 19 1) Electric motor/ solar battery back-up.
- 20 2) Wireless remote control.
- 21 3) Provide rain sensor that automatically closes venting unit when water is detected.
- 22 3. Hinges: Manufacturer's standard.
- 23 H. Fabrication:
- 24 1. Fabricate roof windows that are re-glazed without dismantling sash framing.
- 25 2. Provide full-perimeter weather stripping for each operable sash.
- 26 3. Provide condensation gutter or other means to hold condensed moisture or drain it to exterior.
- 27 4. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to
- 28 greatest extent possible. Disassemble components only as necessary for shipment and installation.
- 29 I. Recycled Content (Minimum Requirements):
- 30 1. Laminated and tempered glass products shall contain 60-65% recycled content by weight.
- 31 Aluminum extrusions shall contain 95% recycled material. Shades shall have 15% recycled vinyl
- 32 content. Packaging shall be 53% recycled and 100% recyclable.

33 2.3 ACCESSORIES

- 34 A. Insect Screens: Manufacturer's standard removable screen; aluminum or vinyl frame with mitered or coped
- 35 joints and with ASTM D 3656 mesh of plastic-coated glass-fiber threads. Provide frame in manufacturer's
- 36 standard finish and mesh in manufacturer's standard color.
- 37 B. Blinds: In color and pattern selected by Architect from manufacturer's full range.
- 38 1. Type: Manufacturer's standard.
- 39 2. Motor Operator: Manufacturer's standard for blinds that are more than 72 inches above floor.
- 40 a. Electric motor.
- 41 b. Wireless remote control.

42 PART 3 - EXECUTION

43 3.1 EXAMINATION

- 44 A. Examine substrates and conditions, with Installer present, for compliance with requirements, rough
- 45 opening dimensions, and other conditions affecting performance of the Work.
- 46 B. Proceed with installation only after unsatisfactory conditions have been corrected.

47 3.2 INSTALLATION

- 48 A. Comply with manufacturer's written installation instructions for installing roof windows and accessories.
- 49 B. Install roof windows square, true, and without distortion, warp, or rack of frames and sash. Securely
- 50 anchor windows to structural support without impeding thermal movement.
- 51 C. Install flashing to provide a watertight and weathertight seal.
- 52 D. Separate aluminum, copper, and other corrodible surfaces from sources of corrosion or electrolytic action
- 53 at points of contact with other materials according to recommendations in ASTM E 2112.

- 1 **3.3 ADJUSTING, CLEANING, AND PROTECTION**
2 A. Adjust operating sash, screens, and accessories for a tight fit at contact points and for smooth operation
3 and weathertight closure.
4 B. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or
5 excessive clearance.
6 C. Adjust blinds to hang true to line without rack. Provide unencumbered operation.
7 D. Clean frame surfaces immediately after installing roof windows. Comply with manufacturer's written
8 instructions for final cleaning and maintenance. Avoid damaging protective coatings and finishes.
9 E. Inspect drainage holes for blockage. Clean and free holes of any obstructions to allow drainage.
10 F. Clean glass immediately after installing roof windows. Comply with manufacturer's written instructions for
11 final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.
12 G. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during
13 construction period.
14 H. Protect roof window surfaces from contact with contaminating substances resulting from construction
15 operations. If contaminating substances contact roof window surfaces, remove contaminants immediately
16 according to manufacturer's written instructions.
17 I. Refinish or replace roof windows that have damaged finishes.
18 J. Replace damaged components.

19 **END OF SECTION**

SECTION 08 71 00

DOOR HARDWARE

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- 2.18 [KEY CONTROL SYSTEM](#)
- 2.19 [DOOR CLOSERS](#)
- 2.20 [CONCEALED DOOR CLOSERS](#)
- 2.21 [ELECTRO-HYDRAULIC AUTOMATIC OPERATORS](#)
- 2.22 [DOOR TRIM](#)
- 2.23 [PROTECTION PLATES](#)
- 2.24 [OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS](#)
- 2.25 [DOOR STOPS AND HOLDERS](#)
- 2.26 [THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING](#)
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PART 1 - GENERAL

1.1 **RELATED DOCUMENTS**

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

1.2 **SUMMARY**

- A. Section includes:

- 1 1. Mechanical and electrified door hardware for:
- 2 a. Swinging doors.
- 3 2. Electronic access control system components, including:
- 4 a. Electronic access control devices.
- 5 3. The intent of the hardware specification is to specify the hardware for interior and exterior doors,
- 6 and to establish a type, continuity, and standard of quality. However, it is the door hardware
- 7 supplier's responsibility to thoroughly review existing conditions, schedules, specifications,
- 8 drawings, and other Contract Documents to verify the suitability of the hardware specified.
- 9 B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:
- 10 1. Windows
- 11 2. Cabinets (casework), including locks in cabinets
- 12 3. Signage
- 13 4. Toilet accessories
- 14 5. Overhead doors
- 15 C. Related Sections:
- 16 1. Division 01 Section "Alternates" for alternates affecting this section.
- 17 2. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation
- 18 specified in this section.
- 19 3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this
- 20 section.
- 21 4. Division 26 sections for connections to electrical power system and for low-voltage wiring.
- 22 5. Division 28 sections for coordination with other components of electronic access control system.

23 **1.3 REFERENCES**

- 24 A. UL - Underwriters Laboratories
- 25 1. UL 10B - Fire Test of Door Assemblies
- 26 2. UL 10C - Positive Pressure Test of Fire Door Assemblies
- 27 3. UL 1784 - Air Leakage Tests of Door Assemblies
- 28 4. UL 305 - Panic Hardware
- 29 B. DHI - Door and Hardware Institute
- 30 1. Sequence and Format for the Hardware Schedule
- 31 2. Recommended Locations for Builders Hardware
- 32 3. Key Systems and Nomenclature
- 33 C. ANSI - American National Standards Institute
- 34 1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and
- 35 Specialties
- 36

1.4 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:

1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated, and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
 - a. Door Index; include door number, heading number, and Architects hardware set number.
 - b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
 - c. Quantity, type, style, function, size, and finish of each hardware item.
 - d. Name and manufacturer of each item.
 - e. Fastenings and other pertinent information.
 - f. Location of each hardware set cross-referenced to indications on Drawings.
 - g. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - h. Mounting locations for hardware.
 - i. Door and frame sizes and materials.
 - j. Name and phone number for local manufacturer's representative for each product.
 - k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
 - 1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
 - 1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

- 1 6. Templates: After final approval of hardware schedule, provide templates for doors, frames and
2 other work specified to be factory or shop prepared for door hardware installation.
- 3 C. Informational Submittals:
- 4 1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
- 5 2. Product data for electrified door hardware:
- 6 a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors
7 complies with listed fire-rated door assemblies.
- 8 3. Certificates of Compliance:
- 9 a. UL listings for fire-rated hardware and installation instructions if requested by Architect or
10 Authority Having Jurisdiction.
- 11 b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting
12 to completion of installer training meeting specified in "QUALITY ASSURANCE" article,
13 herein.
- 14 c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by
15 Contractor, attesting to completion of electrified hardware coordination conference,
16 specified in "QUALITY ASSURANCE" article, herein.
- 17 4. Warranty: Special warranty specified in this Section.
- 18 D. Closeout Submittals:
- 19 1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
- 20 a. Complete information on care, maintenance, and adjustment; data on repair and
21 replacement parts, and information on preservation of finishes.
- 22 b. Catalog pages for each product.
- 23 c. Factory order acknowledgement numbers (for warranty and service)
- 24 d. Name, address, and phone number of local representative for each manufacturer.
- 25 e. Parts list for each product.
- 26 f. Final approved hardware schedule, edited to reflect conditions as-installed.
- 27 g. Final keying schedule
- 28 h. Copies of floor plans with keying nomenclature
- 29 i. As-installed wiring diagrams for each opening connected to power, both low voltage and
30 110 volts.
- 31 j. Copy of warranties including appropriate reference numbers for manufacturers to identify
32 project.

33 **1.5 QUALITY ASSURANCE**

- 34 A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of
35 successful in-service performance for supplying door hardware similar in quantity, type, and quality to that
36 indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to
37 Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
- 38 1. Warehousing Facilities: In Project's vicinity.
- 39 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- 40 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop
41 Drawings, based on testing and engineering analysis of manufacturer's standard units in
42 assemblies similar to those indicated for this Project.
- 43 4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with
44 Architect and electrical engineers and provide installation and technical data to Architect and other
45 related subcontractors.
- 46 a. Upon completion of electronic security hardware installation, inspect and verify that all
47 components are working properly.
- 48 B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting
49 services for door hardware installations that are comparable in material, design, and extent to that
50 indicated for this Project and meets these requirements:
- 51 1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
- 52 2. Can provide installation and technical data to Architect and other related subcontractors.
- 53 3. Can inspect and verify components are in working order upon completion of installation.
- 54 4. Capable of producing wiring diagrams.
- 55 5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.
- 56 C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
- 57 D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and
58 requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products
59 tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting
60 organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated,

- 1 based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with
2 requirements of fire-rated door and door frame labels.
- 3 E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency
4 acceptable to authorities having jurisdiction.
- 5 F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing
6 accessibility regulations cited in "REFERENCES" article, herein.
- 7 G. Keying Conference
- 8 1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware
9 keying system including:
- 10 a. Function of building, flow of traffic, purpose of each area, degree of security required, and
11 plans for future expansion.
- 12 b. Preliminary key system schematic diagram.
- 13 c. Requirements for key control system.
- 14 d. Requirements for access control.
- 15 e. Address for delivery of keys.
- 16 H. Pre-installation Conference
- 17 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel,
18 equipment, and facilities needed to make progress and avoid delays.
- 19 2. Inspect and discuss preparatory work performed by other trades.
- 20 3. Inspect and discuss electrical roughing-in for electrified door hardware.
- 21 4. Review sequence of operation for each type of electrified door hardware.
- 22 5. Review required testing, inspecting, and certifying procedures.
- 23 I. Coordination Conferences:
- 24 1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to
25 review questions or concerns related to proper installation and adjustment of door hardware.
- 26 2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and
27 hold meeting to coordinate door hardware with security, electrical, doors and frames, and other
28 related suppliers.

29 **1.6 DELIVERY, STORAGE, AND HANDLING**

- 30 A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.
- 31 B. Tag each item or package separately with identification coordinated with final door hardware schedule,
32 and include installation instructions, templates, and necessary fasteners with each item or package.
- 33 1. Deliver each article of hardware in manufacturer's original packaging.
- 34 C. Project Conditions:
- 35 1. Maintain manufacturer-recommended environmental conditions throughout storage and installation
36 periods.
- 37 2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of
38 hardware items so that completion of Work will not be delayed by hardware losses both before and
39 after installation.
- 40 D. Protection and Damage:
- 41 1. Promptly replace products damaged during shipping.
- 42 2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair
43 products damaged during Work.
- 44 3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- 45 E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- 46 F. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

47 **1.7 COORDINATION**

- 48 A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring
49 inserts into concrete.
- 50 B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop
51 prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating
52 and installing door hardware to comply with indicated requirements.
- 53 C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security
54 consultant.
- 55 D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with
56 connections to power supplies and building safety and security systems.
- 57 E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing
58 functions, conditions and preparations and coordinate to suit opening conditions and to provide proper
59 door operation.

1 **1.8 WARRANTY**

- 2 A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of
3 door hardware that fail in materials or workmanship within specified warranty period.
4 1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
5 a. Closers:
6 1) Mechanical: 30 years.
7 b. Automatic Operators: 2 years.
8 c. Exit Devices:
9 1) Mechanical: 3 years.
10 2) Electrified: 1 year.
11 d. Locksets:
12 1) Mechanical: 3 years.
13 2) Electrified: 1 year.
14 e. Continuous Hinges: Lifetime warranty.
15 f. Key Blanks: Lifetime
16 2. Warranty does not cover damage or faulty operation due to improper installation, improper use or
17 abuse.

18 **1.9 MAINTENANCE**

- 19 A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of
20 hardware, including changing of cylinders.

21 **PART 2 - PRODUCTS**

22 **2.1 MANUFACTURERS**

- 23 A. The Owner requires use of certain products for their unique characteristics and project suitability to insure
24 continuity of existing and future performance and maintenance standards. After investigating available
25 product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products
26 are specified with the notation: "No Substitute."
27 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be
28 considered.
29 B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or
30 "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with
31 QUALITY ASSURANCE article, herein.
32 C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those
33 products providing all functions and features and meeting all requirements of scheduled manufacturer's
34 product.
35 D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware,
36 furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

37 **2.2 MATERIALS**

- 38 A. Fasteners
39 1. Provide hardware manufactured to conform to published templates, generally prepared for machine
40 screw installation.
41 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any
42 condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish
43 of this other work including prepared for paint surfaces to receive painted finish.
44 3. Provide concealed fasteners for hardware units exposed when door is closed except when no
45 standard units of type specified are available with concealed fasteners. Do not use thru-bolts for
46 installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are
47 required to fasten hardware securely. Review door specification and advise Architect if thru-bolts
48 are required.
49 4. Install hardware with fasteners provided by hardware manufacturer.
50 B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed
51 and reinstalled.
52 1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing
53 materials, as required for mounting new opening hardware and to cover existing door and frame
54 preparations.
55 2. Use materials which match materials of adjacent modified areas.

- 1 3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required
2 to maintain fire-rating.
3 C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware
4 installation.
5 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.
6 D. Cable and Connectors: Hardwired Electronic Access Control Lockset and Exit Device Trim:
7 1. Data: 24AWG, 4 conductor shielded, Belden 9843, 9841 or comparable.
8 2. DC Power: 18 AWG, 2 conductor, Belden 8760 or comparable.
9 3. Provide type of data and DC power cabling required by access control device manufacturer for this
10 installation.
11 4. Where scheduled in the hardware sets, provide each item of electrified hardware and wire
12 harnesses with sufficient number and wire gauge with standardized Molex plug connectors to
13 accommodate electric function of specified hardware. Provide Molex connectors that plug directly
14 into connectors from harnesses, electric locking and power transfer devices. Provide through-door
15 wire harness for each electrified locking device installed in a door and wire harness for each
16 electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for
17 connection to power supplies.

18 2.3 HINGES

- 19 A. Manufacturers and Products:
20 1. Scheduled Manufacturer and Product: Ives 5BB series.
21 2. Acceptable Manufacturers and Products: Hager BB series, McKinney T4B series, Stanley FBB
22 Series.
23 B. Requirements:
24 1. Provide hinges conforming to ANSI/BHMA A156.1.
25 2. 1-3/4 inch thick doors, up to and including 36 inches (914 mm) wide:
26 a. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
27 3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
28 a. Interior: Heavy weight, steel, 5 inches (127 mm) high
29 4. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one
30 additional hinge for each 30 inches (762 mm) of additional door height.
31 5. Where new hinges are specified for existing doors or existing frames, provide new hinges of
32 identical size to hinge preparation present in existing door or existing frame.
33 6. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
34 a. Steel Hinges: Steel pins
35 b. Non-Ferrous Hinges: Stainless steel pins
36 c. Out-Swinging Exterior Doors: Non-removable pins
37 d. Out-Swinging Interior Lockable Doors: Non-removable pins
38 e. Interior Non-lockable Doors: Non-rising pins
39 7. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm)
40 at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall
41 conditions to allow proper degree of opening.

42 2.4 CONTINUOUS HINGES

- 43 A. Aluminum Geared
44 1. Manufacturers:
45 a. Scheduled Manufacturer: Ives.
46 b. Acceptable Manufacturers: Select, Stanley.
47 2. Requirements:
48 a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
49 b. Provide aluminum geared continuous hinges, where specified in the hardware sets,
50 fabricated from 6063-T6 aluminum.
51 c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating
52 operation.
53 d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully
54 tested for 1,500,000 cycles.
55 e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use
56 on rated doors by testing agency acceptable to authority having jurisdiction.
57 f. Provide aluminum geared continuous hinges with electrified option scheduled in the
58 hardware sets. Provide with sufficient number and wire gage to accommodate electric
59 function of specified hardware.
60 g. Install hinges with fasteners supplied by manufacturer.

- 1 h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless
2 otherwise noted or door details require shorter length and with symmetrical hole pattern.

3 **2.5 ELECTRIC POWER TRANSFER**

- 4 A. Manufacturers:
5 a. Scheduled Manufacturer: Von Duprin EPT-10-CON.
6 b. Acceptable Manufacturers: ABH PT1000, Securitron CEPT-10.
7 B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number
8 and gauge of wires sufficient to accommodate electric function of specified hardware.
9 C. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with
10 operation of door or other hardware items.

11 **2.6 PIVOT SETS**

- 12 A. Manufacturers:
13 1. Scheduled Manufacturer: Ives.
14 2. Acceptable Manufacturers: Rixson.
15 B. Requirements:
16 1. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.

17 **2.7 FLUSH BOLTS**

- 18 A. Manufacturers:
19 1. Scheduled Manufacturer: Ives.
20 2. Acceptable Manufacturers: Burns, Rockwood.
21 B. Requirements:
22 1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel
23 face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305
24 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches
25 (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm)
26 of door height. Provide dust-proof strikes at each bottom flush bolt.

27 **2.8 COORDINATORS**

- 28 A. Manufacturers:
29 1. Scheduled Manufacturer: Ives.
30 2. Acceptable Manufacturers: Burns, Rockwood.
31 B. Requirements:
32 1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that
33 requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to
34 underside of stop at frame head.
35 2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets
36 for parallel arm door closers, surface vertical rod exit device strikes or other stop mounted
37 hardware. Factory-prepared coordinators for vertical rod devices as specified.

38 **2.9 MORTISE LOCKS**

- 39 A. Manufacturers and Products:
40 1. Scheduled Manufacturer and Product: Schlage L9000 series. No Substitution.
41 B. Requirements:
42 1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for
43 3 hour fire doors.
44 2. Indicators: Where specified, provide indicator window measuring a minimum 2 inch x 1/2 inch with
45 180 degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for
46 easy visibility.
47 a. Outside Occupancy Indicator: Provide indicator above cylinder or emergency release for
48 visibility while operating the lock that identifies an occupied/unoccupied status of the lock or
49 latch.
50 3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc
51 dichromate plating for corrosion resistance.
52 4. Provide lock case that is multi-function and field reversible for handing without opening case.
53 Cylinders: Refer to "KEYING" article, herein.
54 5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless
55 steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed
56 of stainless steel.

- 1 6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
- 2 7. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches
- 3 and sensors integrated into the locks and latches.
- 4 8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought
- 5 roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
- 6 a. Lever Design: Schlage LATA.
- 7 b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on
- 8 levers on exterior (secure side) of doors serving rooms considered to be hazardous.

9 **2.10 CYLINDRICAL LOCKS – GRADE 1**

- 10 A. Manufacturers and Products:
- 11 1. Scheduled Manufacturer and Product: Schlage ND series. No Substitution.
- 12 B. Requirements:
- 13 1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed
- 14 for 3 hour fire doors.
- 15 2. Cylinders: Refer to “KEYING” article, herein.
- 16 3. Provide locks with standard 2-3/4 inches backset, unless noted otherwise, with 1/2 inch latch throw.
- 17 Provide proper latch throw for UL listing at pairs.
- 18 4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
- 19 5. Provide independently operating levers with two external return spring cassettes mounted under
- 20 roses to prevent lever sag.
- 21 6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
- 22 7. Provide electrified options as scheduled in the hardware sets.
- 23 8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
- 24 a. Lever Design: Schlage LAT.
- 25 b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on
- 26 levers on exterior (secure side) of doors serving rooms considered to be hazardous.

27 **2.11 AUXILIARY LOCKS**

- 28 A. Deadbolts:
- 29 1. Manufacturers and Products:
- 30 a. Scheduled Manufacturer and Product: Schlage B600 and Falcon D271 Series. No
- 31 Substitution.
- 32 2. Requirements:
- 33 a. Provide deadbolt series conforming to ANSI/BHMA A156 and function as specified.
- 34 b. Cylinders: Refer to “KEYING” article, herein.
- 35 c. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60
- 36 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1 inch (25
- 37 mm) throw, constructed of steel alloy.
- 38 d. Provide manufacturer’s standard strike.
- 39 B. Mortise Lock - Narrow Style and Marine Grade:
- 40 1. Manufacturers and Products:
- 41 a. Scheduled Manufacturer and Product: Accurate 8800 and 9100M Series. No Substitution.
- 42 2. Requirements:
- 43 a. Provide narrow style aluminum door deadbolts as specified.
- 44 b. Cylinders: Refer to “KEYING” article, herein.
- 45 c. Provide deadbolts with necessary backset with full 1-13/32 inches (36 mm) throw deadbolt.
- 46 d. Provide manufacturer’s standard strikes unless extended lip strikes are necessary to protect
- 47 trim.

48 **2.12 EXIT DEVICES**

- 49 A. Manufacturers and Products:
- 50 1. Scheduled Manufacturer and Product: Von Duprin 98/35A series. No Substitution.
- 51 B. Requirements:
- 52 1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit
- 53 Hardware.
- 54 2. Cylinders: Refer to “KEYING” article, herein.
- 55 3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum,
- 56 plated to standard architectural finishes to match balance of door hardware.
- 57 4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in
- 58 touchpads.

- 1 5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits
- 2 and/or other electrified requirements.
- 3 6. Provide flush end caps for exit devices.
- 4 7. Provide exit devices with manufacturer's approved strikes.
- 5 8. Provide exit devices cut to door width and height. Install exit devices at height recommended by
- 6 exit device manufacturer, allowable by governing building codes, and approved by Architect.
- 7 9. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices.
- 8 Where glass trim or molding projects off face of door, provide glass bead kits.
- 9 10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
- 10 11. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive
- 11 areas, and where noted in hardware sets.
- 12 12. Provide electrified options and connectors as scheduled.
- 13 13. Concealed Vertical Cable Exit Devices: provide cable-actuated concealed vertical latch system in
- 14 two-point for non-rated or fire rated wood doors up to a 90 minute rating and less bottom latch
- 15 (LBL) configuration for non-rated or fire rated wood doors up to 20 minute rating. Vertical rods not
- 16 permitted.
- 17 a. Cable: Stainless steel with abrasive resistant coating. Conduit and core wire ends snap into
- 18 latch and center slides without use of tools.
- 19 b. Wood Door Prep: Maximum 1 inch x 1.1875 inch x 3.875 inches top latch pocket and 1 inch
- 20 x 1.1875 inch x 5 inches bottom latch pocket which does not require the use of a metal wrap
- 21 or edge for non-rated or fire rated wood doors up to a 45 minute rating.
- 22 c. Latchbolts and Blocking Cams: Manufactured from sintered metal low carbon copper-
- 23 infiltrated steel, with molybdenum disulfide low friction coating.
- 24 d. Top Latchbolt: Minimum 0.38 inch (10 mm) and greater than 90 degree engagement with
- 25 strike to prevent door and frame separation under high static load.
- 26 e. Bottom Latchbolt: Minimum of 0.44 inch (11 mm) engagement with strike.
- 27 f. Product Cycle Life: 1,000,000 cycles.
- 28 g. Latch Operation: Top and bottom latch operate independently of each other. Top latch fully
- 29 engages top strike even when bottom latch is compromised. Separate trigger mechanisms
- 30 not permitted.
- 31 h. Latch release does not require separate trigger mechanism.
- 32 i. Cable and latching system characteristics:
- 33 1) Installed independently of exit device installation, and capable of functioning on door
- 34 prior to device and trim installation.
- 35 2) Connected to exit device at single point in steel and aluminum doors, and two points
- 36 for top and bottom latches in wood doors.
- 37 3) Bottom latch height adjusted, from single point for steel and aluminum doors and two
- 38 points for wood doors, after system is installed and connected to exit device, while
- 39 door is hanging
- 40 4) Bottom latch position altered up and down minimum of 2 inches (51 mm) in steel and
- 41 aluminum doors without additional adjustment. Bottom latch deadlocks in every
- 42 adjustment position in wood doors.
- 43 5) Top and bottom latches in steel and aluminum doors and top latch in wood doors
- 44 may be removed while door is hanging.
- 45 14. Top latch mounting: double or single tab mount for steel doors, face mount for aluminum doors
- 46 eliminating requirement of tabs, and double tab mount for wood doors.
- 47 15. Provide exit devices with optional trim designs to match other lever and pull designs used on the
- 48 project.
- 49 a. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on
- 50 levers on exterior (secure side) of doors serving rooms considered to be hazardous.

51 **2.13 ELECTRIC STRIKES**

- 52 A. Manufacturers and Products:
- 53 1. Scheduled Manufacturer and Product: Von Duprin 6000 Series.
- 54 2. Acceptable Manufacturers and Products: Folger Adam 300 Series.
- 55 B. Requirements:
- 56 1. Provide electric strikes designed for use with type of locks shown at each opening.
- 57 2. Provide electric strikes UL Listed as burglary-resistant.
- 58 3. Where required, provide electric strikes UL Listed for fire doors and frames.
- 59 4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical
- 60 contractor.

- 1 **2.14 POWER SUPPLIES**
- 2 A. Manufacturers and Products:
- 3 1. Scheduled Manufacturer and Product: Schlage/Von Duprin PS900 series.
- 4 2. Acceptable Manufacturers and Products: Sargent 3500 series.
- 5 B. Requirements:
- 6 1. Provide power supplies approved by manufacturer of supplied electrified hardware.
- 7 2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking
- 8 components as recommended by manufacturer of electrified locking components with
- 9 consideration for each electrified component using power supply, location of power supply, and
- 10 approved wiring diagrams. Locate power supplies as directed by Architect.
- 11 3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
- 12 4. Provide power supplies with the following features:
- 13 a. 12/24 VDC Output, field selectable.
- 14 b. Class 2 Rated power limited output.
- 15 c. Universal 120-240 VAC input.
- 16 d. Low voltage DC, regulated and filtered.
- 17 e. Polarized connector for distribution boards.
- 18 f. Fused primary input.
- 19 g. AC input and DC output monitoring circuit w/LED indicators.
- 20 h. Cover mounted AC Input indication.
- 21 i. Tested and certified to meet UL294.
- 22 j. NEMA 1 enclosure.
- 23 k. Hinged cover w/lock down screws.
- 24 l. High voltage protective cover.
- 25 **2.15 ROLLER LATCHES**
- 26 A. Manufacturers:
- 27 1. Scheduled Manufacturer: Ives.
- 28 2. Acceptable Manufacturers: Burns, Rockwood.
- 29 B. Requirements:
- 30 1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If
- 31 dummy levers are used in conjunction with roller latch mount roller latch at a height as to not
- 32 interfere with proper mounting and height of dummy lever.
- 33 2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of
- 34 each leaf per manufacturer's template.
- 35 **2.16 CYLINDERS**
- 36 A. Manufacturers and Products:
- 37 1. Scheduled Manufacturer and Product: Schlage Everest 29 T. No Substitution.
- 38 B. Requirements:
- 39 1. Provide cylinders/cores, from the same manufacturer of locksets, compliant with
- 40 ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series
- 41 as indicated. Refer to "KEYING" article, herein.
- 42 2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as
- 43 indicated.
- 44 a. Conventional Patented Restricted: cylinder with interchangeable core with patented,
- 45 restricted keyway.
- 46 3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent-protected until
- 47 the year, 2029.
- 48 4. Nickel silver bottom pins.
- 49 C. Construction Keying:
- 50 1. Replaceable Construction Cores.
- 51 a. Provide temporary construction cores replaceable by permanent cores, furnished in
- 52 accordance with the following requirements.
- 53 1) 3 construction control keys
- 54 2) 12 construction change (day) keys.
- 55 b. Owner or Owner's Representative will replace temporary construction cores with permanent
- 56 cores.
- 57 **2.17 KEYING**
- 58 A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28,
- 59 incorporating decisions made at keying conference.

- 1 B. Requirements:
- 2 1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key
- 3 system.
- 4 a. Master Keying system as directed by the Owner.
- 5 2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to
- 6 comply with forwarding requirements will be cause for replacement of cylinders/cores involved at
- 7 no additional cost to Owner.
- 8 3. Provide keys with the following features:
- 9 a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
- 10 b. Patent Protection: Keys and blanks protected by one or more utility patent(s) until the year,
- 11 2029.
- 12 4. Identification:
- 13 a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication
- 14 "Keying Systems and Nomenclature" for identification. Do not provide blind code marks with
- 15 actual key cuts.
- 16 b. Identification stamping provisions must be approved by the Architect and Owner.
- 17 c. Stamp cylinders/cores and keys with Owner's unique key system facility code as
- 18 established by the manufacturer; key symbol and embossed or stamped with "DO NOT
- 19 DUPLICATE" along with the "PATENTED" or patent number to enforce the patent
- 20 protection.
- 21 d. Failure to comply with stamping requirements will be cause for replacement of keys involved
- 22 at no additional cost to Owner.
- 23 e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed
- 24 by Owner.
- 25 5. Quantity: Furnish in the following quantities.
- 26 a. Change (Day) Keys: 3 per cylinder/core.
- 27 b. Permanent Control Keys: 3.
- 28 c. Master Keys: 6.

29 **2.18 KEY CONTROL SYSTEM**

- 30 A. Manufacturers:
- 31 1. Scheduled Manufacturer: Telkee.
- 32 2. Acceptable Manufacturers: HPC, Lund.
- 33 B. Requirements:
- 34 1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt
- 35 forms, 3-way visible card index, temporary markers, permanent markers, and standard metal
- 36 cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks
- 37 required for Project.
- 38 a. Provide complete cross index system set up by hardware supplier, and place keys on
- 39 markers and hooks in cabinet as determined by final key schedule.
- 40 b. Provide hinged-panel type cabinet for wall mounting.

41 **2.19 DOOR CLOSERS**

- 42 A. Manufacturers and Products:
- 43 1. Scheduled Manufacturer and Product: LCN 4040XP series. No Substitution.
- 44 B. Requirements:
- 45 1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified
- 46 independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture
- 47 code.
- 48 2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron
- 49 cylinder, and full complement bearings at shaft.
- 50 3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 3/4 inch (19 mm) diameter double heat-treated
- 51 pinion journal.
- 52 4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer
- 53 adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
- 54 5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced
- 55 opening force as required by accessibility codes and standards.
- 56 6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch
- 57 speed, general speed, and backcheck.
- 58 7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged
- 59 forearms for parallel arm closers.
- 60 8. Pressure Relief Valve (PRV) Technology: Not permitted.

- 1 9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which
2 has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4
3 and ASTM B117, or has special rust inhibitor (SRI).
4 10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for
5 details, overhead stops, and other door hardware items interfering with closer mounting.

6 **2.20 CONCEALED DOOR CLOSERS**

7 A. Manufacturers and Products:

- 8 1. Scheduled Manufacturer and Product: LCN 6030 series. No Substitution.

9 B. Requirements:

- 10 1. Provide concealed door closers at doors conforming to ANSI/BHMA A156.4 Grade 1 requirements
11 by BHMA certified independent testing laboratory.
12 2. Provide heavy duty, double-acting closers with single lever arm and roller assembly.
13 3. Provide closers capable of being mounted in a minimum 1-3/4 inch header.
14 4. Provide concealed door closers with fully hydraulic, full rack and pinion action with high strength
15 cast iron cylinder, and full complement bearings at shaft.
16 5. Cylinder Body: 1-1/8 inch (29 mm) piston diameter, with 5/8 inch (16 mm) diameter heat-treated
17 pinion journal.
18 6. Provide all-weather hydraulic fluid, fireproof, passing requirements of UL10C.
19 7. Pressure Relief Valve (PRV) Technology: Not permitted.
20 8. Provide special template, drop plates, mounting brackets, or adapters for arms as required for
21 details, overhead stops, and other door hardware items interfering with closer mounting.

22 **2.21 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS**

23 A. Manufacturers and Products:

- 24 1. Scheduled Manufacturer and Product: LCN 4600 series.
25 2. Acceptable Manufacturers and Products: Norton 6000 series, Besam Power Swing.

26 B. Requirements:

- 27 1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA
28 A156.19.
29 2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer
30 adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
31 3. Provide units with conventional door closer opening and closing forces unless power operator
32 motor is activated. Provide door closer assembly with adjustable spring size, back-check, and
33 opening and closing speed adjustment valves to control door
34 4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface
35 delay, electric lock delay, and door hold open delay.
36 5. Provide units with conventional door closer opening and closing forces unless power operator
37 motor is activated. Provide door closer assembly with adjustable spring size, back-check valve,
38 sweep valve, latch valve to control door.
39 6. Provide drop plates, brackets, or adapters for arms as required for details.
40 7. Provide hard-wired actuator switches for operation as specified.
41 8. Provide weather-resistant actuators at exterior applications.
42 9. Provide key switches with LED's, recommended and approved by manufacturer of automatic
43 operator as required for function described in operation description of hardware group below.
44 Cylinders: Refer to "KEYING" article, herein.
45 10. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material
46 recommended and approved by manufacturer of automatic operator for each individual leaf.
47 Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule
48 doors with automatic operators to allow ingress or egress through both sets of openings as directed
49 by Architect. Locate actuators, key switches, and other controls as directed by Architect.
50 11. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for
51 interfacing with latching or locking devices.

52 **2.22 DOOR TRIM**

53 A. Manufacturers:

- 54 1. Scheduled Manufacturer: Ives.
55 2. Acceptable Manufacturers: Burns, Rockwood.

56 B. Requirements:

- 57 1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm)
58 thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate,
59 adjust width to fit.

- 1 2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of
- 2 sufficient length to span from center to center of each stile. Where required, mount back to back
- 3 with pull.
- 4 3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount
- 5 back to back with push bar.
- 6 4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
- 7 5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to
- 8 back with push bar.
- 9 6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick,
- 10 beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102
- 11 mm) wide plate, adjust width to fit.
- 12 7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
- 13 8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

14 **2.23 PROTECTION PLATES**

- 15 A. Manufacturers:
- 16 1. Scheduled Manufacturer: Ives.
- 17 2. Acceptable Manufacturers: Burns, Rockwood.
- 18 B. Requirements:
- 19 1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled
- 20 four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
- 21 2. Sizes of plates:
- 22 a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single
- 23 doors, 1 inch (25 mm) less width of door on pairs
- 24 b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors,
- 25 1 inch (25 mm) less width of door on pairs
- 26 c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single
- 27 doors, 1 inch (25 mm) less width of door on pairs

28 **2.24 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS**

- 29 A. Manufacturers:
- 30 1. Scheduled Manufacturers: Glynn-Johnson. No Substitution.
- 31 B. Requirements:
- 32 1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and
- 33 interior vestibule single acting doors.
- 34 2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting
- 35 doors.
- 36 3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for
- 37 interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors
- 38 and at any door that swings more than 140 degrees before striking wall, open against equipment,
- 39 casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping
- 40 hazard.
- 41 4. Where overhead holders are specified provide friction type at doors without closer and positive type
- 42 at doors with closer.

43 **2.25 DOOR STOPS AND HOLDERS**

- 44 A. Manufacturers:
- 45 1. Scheduled Manufacturer: Ives.
- 46 2. Acceptable Manufacturers: Burns, Rockwood.
- 47 B. Provide door stops at each door leaf:
- 48 1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and
- 49 concave type where cylindrical type locks are used.
- 50 2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
- 51 3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

52 **2.26 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING**

- 53 A. Manufacturers:
- 54 1. Scheduled Manufacturer: Zero International.
- 55 2. Acceptable Manufacturers: National Guard, Reese.
- 56 B. Requirements:

- 1 1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing
- 2 systems (including smoke, sound, and light) as specified and per architectural details. Match finish
- 3 of other items.
- 4 2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are
- 5 required, provide door hardware that meets requirements of assemblies tested according to UL
- 6 1784 and installed in compliance with NFPA 105.
- 7 3. Size of thresholds:
- 8 a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
- 9 b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
- 10 4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or
- 11 flexible seal strip is easily replaceable and readily available.

12 2.27 SILENCERS

- 13 A. Manufacturers:
- 14 1. Scheduled Manufacturer: Ives.
- 15 2. Acceptable Manufacturers: Burns, Rockwood.
- 16 B. Requirements:
- 17 1. Provide "push-in" type silencers for hollow metal or wood frames.
- 18 2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair
- 19 frame.
- 20 3. Omit where gasketing is specified.

21 2.28 DOOR POSITION SWITCHES

- 22 A. Manufacturers:
- 23 1. Scheduled Manufacturer: Schlage.
- 24 2. Acceptable Manufacturers: GE-Interlogix, Sargent.
- 25 B. Requirements:
- 26 1. Provide recessed or surface mounted type door position switches as specified.
- 27 2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used
- 28 with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic
- 29 locking device.

30 2.29 LATCH PROTECTORS

- 31 A. Manufacturers:
- 32 1. Scheduled Manufacturer: Ives.
- 33 2. Acceptable Manufacturers: Burns, Rockwood.
- 34 B. Provide stainless steel latch protectors of type required to function with specified lock.

35 2.30 FINISHES

- 36 A. Finish: BHMA 626/652 (US26D); except:
- 37 1. Continuous Hinges: BHMA 628 (US28)
- 38 2. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
- 39 3. Protection Plates: BHMA 630 (US32D)
- 40 4. Overhead Stops and Holders: BHMA 630 (US32D)
- 41 5. Door Closers: Powder Coat to Match
- 42 6. Wall Stops: BHMA 630 (US32D)
- 43 7. Latch Protectors: BHMA 630 (US32D)
- 44 8. Weatherstripping: Clear Anodized Aluminum
- 45 9. Thresholds: Mill Finish Aluminum

46 PART 3 - EXECUTION

47 3.1 EXAMINATION

- 48 A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with
- 49 requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor
- 50 construction, and other conditions affecting performance.
- 51 B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new
- 52 openings. Verify that new hardware is compatible with existing door and frame preparation and existing
- 53 conditions.

- 1 C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before
2 electrified door hardware installation.
3 D. Proceed with installation only after unsatisfactory conditions have been corrected.
- 4 **3.2 INSTALLATION**
- 5 A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required
6 to comply with governing regulations.
7 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
8 2. Custom Steel Doors and Frames: HMMA 831.
9 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush
10 Doors."
11 B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using
12 only fasteners provided by manufacturer.
13 C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed
14 hardware during painting.
15 D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as
16 necessary for proper installation and operation.
17 E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and
18 anchors according to industry standards.
19 F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
20 G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity
21 recommended by manufacturer for application indicated or one hinge for every 30 inches of door height,
22 whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or
23 pivots, are provided.
24 H. Lock Cylinders: Install construction cores to secure building and areas during construction period.
25 1. Replace construction cores with permanent cores as indicated in keying section.
26 I. Wiring: Coordinate with Division 26, ELECTRICAL sections for:
27 1. Conduit, junction boxes and wire pulls.
28 2. Connections to and from power supplies to electrified hardware.
29 3. Connections to fire/smoke alarm system and smoke evacuation system.
30 4. Connection of wire to door position switches and wire runs to central room or area, as directed by
31 Architect.
32 5. Testing and labeling wires with Architect's opening number.
33 J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as
34 determined by final keying schedule.
35 K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of
36 stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public
37 spaces unless approved by Architect.
38 L. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in
39 equipment room, or alternate location as directed by Architect.
40 M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07
41 Section "Joint Sealants."
42 N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware
43 schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
44 O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
45 P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
46 Q. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

47 **3.3 FIELD QUALITY CONTROL**

- 48 A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection
49 reports.
50 1. Representative will inspect door hardware and state in each report whether installed work complies
51 with or deviates from requirements, including whether door hardware is properly installed and
52 adjusted.

53 **3.4 ADJUSTING**

- 54 A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper
55 operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust
56 door control devices to compensate for final operation of heating and ventilating equipment and to comply
57 with referenced accessibility requirements.
58 1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

- 1 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of
2 authorities having jurisdiction.
- 3 B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's
4 Architectural Hardware Consultant must examine and readjust each item of door hardware, including
5 adjusting operating forces, as necessary to ensure function of doors and door hardware.
- 6 **3.5 CLEANING AND PROTECTION**
- 7 A. Clean adjacent surfaces soiled by door hardware installation.
- 8 B. Clean operating items as necessary to restore proper function and finish.
- 9 C. Provide final protection and maintain conditions that ensure door hardware is without damage or
10 deterioration at time of Substantial Completion.
- 11 **3.6 DOOR HARDWARE SCHEDULE**
- 12 A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special
13 features, options, cylinders/keying, and other requirements.
- 14 B. Hardware Sets:

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1 Hardware Group No. 01
2 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	ELEC PANIC HARDWARE	HD-QEL-35A-EO-CON 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	HD-QEL-35A-NL-OP-388-CON 24 VDC	626	VON
1	EA	MULLION STORAGE KIT	MT54	689	VON
1	EA	RIM HOUSING	20-079	626	SCH
2	EA	FSIC CORE	23-030 EV29 T	626	SCH
2	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	MORTISE CYLINDER	26-094 X K510-730 36-083 36-082-037	626	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630-316	IVE
1	EA	CONC. OVERHEAD STOP	1000SL X CORRECT SIZE - USE WITH AUTO-OPERATOR	630	ABH
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-856T	630	LCN
1	EA	BOLLARD POST FOR ACTUATOR BUTTON AND CARD READER	CUSTOM STYLE WITH INGRESS'R 36" PUSH AND CARD READER	630	WIK
2	EA	ASTRAGAL	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-V3-223	A	ZER
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	POWER SUPPLY	PS904 900-4RL 120/240 VAC	LGR	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE
1			WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

3 CREDENTIAL READER DEVICE WILL RETRACT THE LATCHES, ENABLE THE PULL SIDE AUTO-
4 OPERATOR ACTUATOR BUTTON AND SHUNT ANY ALARM ASSOCIATED WITH THE DOOR
5 CONTACTS ALLOWING MANUAL OR AUTOMATIC INGRESS. IMMEDIATE EGRESS IS ALWAYS
6 AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

7
8 POWER FOR THE AUTO-OPERATOR IS BY THE ELECTRICAL CONTRACTOR.

9
10 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
11 CREDENTIAL READER DEVICE.
12 WIRING TO THE PS904 POWER SUPPLY (WHICH POWERS THE QEL ELECTRIC LATCH
13 RETRACTION FEATURE INSIDE THE PANIC HARDWARE), THE QEL ELECTRIC LATCH
14 RETRACTION FEATURE ITSELF AND THE AUTO-OPERATOR.
15 REQUIRED POWER AND WIRING TO THE DOOR CONTACT.

16 Hardware Group No. 02
17 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	ELEC PANIC HARDWARE	HD-QEL-35A-EO-CON 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	HD-QEL-35A-NL-OP-388-CON 24 VDC	626	VON
1	EA	MULLION STORAGE KIT	MT54	689	VON
1	EA	RIM HOUSING	20-079	626	SCH
2	EA	FSIC CORE	23-030 EV29 T	626	SCH
2	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	MORTISE CYLINDER	26-094 X K510-730 36-083 36-082-037	626	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630-316	IVE
1	EA	CONC. OVERHEAD STOP	1000SL X CORRECT SIZE - USE WITH AUTO-OPERATOR	630	ABH
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	ACTUATOR, WALL MOUNT	8310-856T	630	LCN
1	EA	BOLLARD POST FOR ACTUATOR BUTTON AND CARD READER	CUSTOM STYLE WITH INGRESS'R 36" PUSH AND CARD READER	630	WIK
2	EA	ASTRAGAL	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-V3-223	A	ZER
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	POWER SUPPLY	PS902 900-4RL 120/240 VAC	LGR	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE
1			WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

1 CREDENTIAL READER DEVICE WILL RETRACT THE LATCHES, ENABLE THE PULL SIDE AUTO-
2 OPERATOR ACTUATOR BUTTON AND SHUNT ANY ALARM ASSOCIATED WITH THE DOOR
3 CONTACTS ALLOWING MANUAL OR AUTOMATIC INGRESS. IMMEDIATE EGRESS IS ALWAYS
4 AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

5
6 POWER FOR THE AUTO-OPERATOR IS BY THE ELECTRICAL CONTRACTOR.
7

8 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
9 CREDENTIAL READER DEVICE.

10 WIRING TO THE PS902 POWER SUPPLY (WHICH POWERS THE QEL ELECTRIC LATCH
11 RETRACTION FEATURE INSIDE THE PANIC HARDWARE), THE QEL ELECTRIC LATCH
12 RETRACTION FEATURE ITSELF AND THE AUTO-OPERATOR.
13 REQUIRED POWER AND WIRING TO THE DOOR CONTACT.

14 Hardware Group No. 03

15 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
2	EA	ELEC PANIC HARDWARE	HD-QEL-35A-EO-CON 24 VDC	626	VON
1	EA	MULLION STORAGE KIT	MT54	689	VON
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	MORTISE CYLINDER	26-094 X K510-730 36-083 36-082-037	626	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630-316	IVE
2	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	ASTRAGAL	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-V3-223	A	ZER
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE
1			WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

1 TIMED LOCKING/UNLOCKING IS AVAILABLE. ACCESS CONTROL SYSTEM WILL RETRACT THE
2 LATCHES AND SHUNT ANY ALARM ASSOCIATED WITH THE DOOR CONTACTS. IMMEDIATE
3 EGRESS IS ALWAYS AVAILABLE.

4
5 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
6 WIRING TO THE PS904 POWER SUPPLY AT OTHER EXTERIOR DOOR (WHICH POWERS THE QEL
7 ELECTRIC LATCH RETRACTION FEATURE INSIDE THE PANIC HARDWARE) AND THE QEL
8 ELECTRIC LATCH RETRACTION FEATURE ITSELF.
9 REQUIRED POWER AND WIRING TO THE DOOR CONTACT.

10 Hardware Group No. 04

11 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	35A-EO	626	VON
1	EA	PANIC HARDWARE	35A-NL-OP-388	626	VON
1	EA	MULLION STORAGE KIT	MT54	689	VON
1	EA	RIM HOUSING	20-079	626	SCH
2	EA	FSIC CORE	23-030 EV29 T	626	SCH
2	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	MORTISE CYLINDER	26-094 X K510-730 36-083 36-082-037	626	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630-316	IVE
2	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	ASTRAGAL	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-V3-223	A	ZER
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1			WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

1 OPENING TO BE MONITORED ONLY.

2

3 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
4 REQUIRED POWER AND WIRING TO THE DOOR CONTACT.

5 Hardware Group No. 05

6 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	35A-NL-OP-388	626	VON
1	EA	RIM HOUSING	20-079	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630-316	IVE
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-V3-223	A	ZER
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1			WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

7 OPENING TO BE MONITORED ONLY.

8

9 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
10 REQUIRED POWER AND WIRING TO THE DOOR CONTACT.

11 Hardware Group No. 06

12 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	35A-NL-OP-388	626	VON
1	EA	RIM HOUSING	20-079	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630-316	IVE
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	625A-V3-223	A	ZER
1		WEATHERSTRIP BY DOOR/FRAME MANUFACTURER			

1 Hardware Group No. 07

2 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR	350	626	VON
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630-316	IVE
1	EA	CONC. OVERHEAD STOP	1000SL X CORRECT SIZE - USE WITH AUTO-OPERATOR	630	ABH
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-856T	630	LCN
1	EA	BOLLARD POST FOR ACTUATOR BUTTON	INGRESS'R 36" PUSH PAD STYLE	630	WIK
2	EA	BOLLARD POST FOR ACTUATOR BUTTON	VERIFY DESIRED STYLE WITH ARCHITECT PRIOR TO BIDDING OR ORDERING	630	WIK

3 POWER FOR THE AUTO-OPERATOR IS BY THE ELECTRICAL CONTRACTOR.

4 Hardware Group No. 08

5 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR	350	626	VON
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630- 316	IVE
1	EA	CONC. OVERHEAD STOP	1000SL X CORRECT SIZE - USE WITH AUTO-OPERATOR	630	ABH
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	ACTUATOR, WALL MOUNT	8310-856T	630	LCN

1 POWER FOR THE AUTO-OPERATOR IS BY THE ELECTRICAL CONTRACTOR.

2 Hardware Group No. 09

3 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR	350	626	VON
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630- 316	IVE
2	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN

4 Hardware Group No. 10

5 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	224XY	628	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	PANIC HARDWARE	LD-9875-EO	626	VON
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	JAMB SEALS	328AA-S	628	ZER
1	EA	HEAD SEAL (MOUNT PRIOR TO OTHER HEAD MTD HDW)	429A	AA	ZER
1	EA	OVERLAPPING ASTRAGAL	322A-S - MOUNT ON INSIDE OF INACTIVE LEAF	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	ASTRAGAL	43SP - MOUNT ON OUTSIDE OF ACTIVE LEAF	SP	ZER
1	EA	THRESHOLD	566A-V3-223	A	ZER
2	EA	DOOR CONTACT	679-05HM	BLK	SCE

1 OPENING TO BE MONITORED ONLY.

2

3 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
4 REQUIRED POWER AND WIRING TO THE DOOR CONTACT.

5 Hardware Group No. 11

6 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	224XY	628	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	MARINE GRADE STOREROOM LOCK	9124M X SCH LATA TRIM	630	ACC
1	EA	STOREROOM LOCK	L9080L LATA LLL LLL LESS LOCK CASE	630	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	MORTISE CYLINDER	30-137 X L583-255 36-083 36-082- 037	626	SCH
2	EA	OH STOP & HOLDER	90F	630	GLY
4	EA	ARMOR PLATE	8400 36" X 1" LDW B-CS	630	IVE

7 Hardware Group No. 12

8 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	ARMOR PLATE	8400 36" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	JAMB SEALS	328AA-S	628	ZER
1	EA	HEAD SEAL (MOUNT PRIOR TO OTHER HEAD MTD HDW)	429A	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	566A-V3-223	A	ZER
1	EA	LATCH GUARD	HES 150	630	HES
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE

9 CREDENTIAL READER DEVICE WILL RELEASE THE ELECTRIC STRIKE AND SHUNT ANY ALARM
10 ASSOCIATED WITH THE DOOR CONTACTS ALLOWING THE DOOR TO BE OPENED. IMMEDIATE
11 EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

12

13 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:

14 CREDENTIAL READER DEVICE.

15 REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE AND THE DOOR CONTACT.

16 Hardware Group No. 13

17 Provide each SGL door(s) with the following:

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QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	CLASSROOM LOCK	ND70JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	LOCK GUARD	LG12	630	IVE
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	SET	JAMB SEALS	328AA-S	628	ZER
1	EA	HEAD SEAL (MOUNT PRIOR TO OTHER HEAD MTD HDW)	429A	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	566A-V3-223	A	ZER

1 Hardware Group No. 14

2 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	PANIC HARDWARE	3549A-EO	626	VON
1	EA	PANIC HARDWARE	3549A-NL-OP-388	626	VON
1	EA	RIM HOUSING	20-079	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD 10" O	630- 316	IVE
2	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN

3 Hardware Group No. 15

4 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	CONT. HINGE	224XY EPT	628	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	ELECTRIC STRIKE	6223 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	ARMOR PLATE	8400 36" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	OVERLAPPING ASTRAGAL	322A-S	AA	ZER
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE

1 CREDENTIAL READER DEVICE WILL RELEASE THE ELECTRIC STRIKE AND SHUNT ANY ALARM
2 ASSOCIATED WITH THE DOOR CONTACTS ALLOWING THE DOOR TO BE OPENED. IMMEDIATE
3 EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.
4

5 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
6 CREDENTIAL READER DEVICE.

7 REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE AND THE DOOR CONTACT.

8 Hardware Group No. 16

9 Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	CONT. HINGE	224XY EPT	628	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	ELECTRIC STRIKE	6223 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	ARMOR PLATE	8400 36" X 1" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	OVERLAPPING ASTRAGAL	322A-S	AA	ZER
2	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE

1 CREDENTIAL READER DEVICE WILL RELEASE THE ELECTRIC STRIKE AND SHUNT ANY ALARM
2 ASSOCIATED WITH THE DOOR CONTACTS ALLOWING THE DOOR TO BE OPENED. IMMEDIATE
3 EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

4
5 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
6 CREDENTIAL READER DEVICE.
7 REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE AND THE DOOR CONTACT.
8 Hardware Group No. 17

9 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	ARMOR PLATE	8400 36" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE

10 CREDENTIAL READER DEVICE WILL RELEASE THE ELECTRIC STRIKE AND SHUNT ANY ALARM
11 ASSOCIATED WITH THE DOOR CONTACTS ALLOWING THE DOOR TO BE OPENED. IMMEDIATE
12 EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

13
14 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
15 CREDENTIAL READER DEVICE.
16 REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE AND THE DOOR CONTACT.
17 Hardware Group No. 18

18 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	ARMOR PLATE	8400 36" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE

19 CREDENTIAL READER DEVICE WILL RELEASE THE ELECTRIC STRIKE AND SHUNT ANY ALARM
20 ASSOCIATED WITH THE DOOR CONTACTS ALLOWING THE DOOR TO BE OPENED. IMMEDIATE
21 EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

22
23 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
24 CREDENTIAL READER DEVICE.
25 REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE AND THE DOOR CONTACT.
26 Hardware Group No. 19

27 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE

1 CREDENTIAL READER DEVICE WILL RELEASE THE ELECTRIC STRIKE AND SHUNT ANY ALARM
2 ASSOCIATED WITH THE DOOR CONTACTS ALLOWING THE DOOR TO BE OPENED. IMMEDIATE
3 EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

4

5 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:

6 CREDENTIAL READER DEVICE.

7 REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE AND THE DOOR CONTACT.

8 Hardware Group No. 20

9 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR CONTACT	679-05HM	BLK	SCE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)	BLK	SCE

10 CREDENTIAL READER DEVICE WILL RELEASE THE ELECTRIC STRIKE AND SHUNT ANY ALARM
11 ASSOCIATED WITH THE DOOR CONTACTS ALLOWING THE DOOR TO BE OPENED. IMMEDIATE
12 EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

13

14 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:

15 CREDENTIAL READER DEVICE.

16 REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE AND THE DOOR CONTACT.

17 Hardware Group No. 21

18 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

1 Hardware Group No. 22

2 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	ND80JD LAT	626	SCH
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	GASKETING	488SBK PSA	BK	ZER

3 Hardware Group No. 23

4 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY	628	IVE
1	EA	STOREROOM LOCK	L9080L LATA LLL LLL LESS LOCK CASE	626	SCH
1	EA	NARROW STILE MORTISE LOCK BODY	STOREROOM LOCK 8859	626	ACC
1	EA	FSIC CORE	23-030 EV29 T	626	SCH
1	EA	FSIC CORE	23-030 ICX	622	SCH
1	EA	MORTISE CYLINDER	30-137 X L583-255 36-083 36-082- 037	626	SCH
1	EA	ELECTRIC STRIKE	6211AL FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	DOOR CONTACT	679-05HM	BLK	SCE

5 CREDENTIAL READER DEVICE WILL RELEASE THE ELECTRIC STRIKE AND SHUNT ANY ALARM
6 ASSOCIATED WITH THE DOOR CONTACTS ALLOWING THE DOOR TO BE OPENED. IMMEDIATE
7 EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

8

9 ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:

10 CREDENTIAL READER DEVICE.

11 REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE AND THE DOOR CONTACT.

12 Hardware Group No. 24

13 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S LAT	626	SCH
1	EA	TURN I/S X OCC IND	D271	626	FAL
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	TOOSHLIGHT REQUIRED COMPONENTS AND ACCESSORIES	TO BE COMPATIBLE WITH A FALCON D271 TO CONECT TO LIGHT ABOVE DOOR	UNF	MIS

1 Hardware Group No. 25

2 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S LAT	626	SCH
1	EA	TURN I/S X OCC IND	D271	626	FAL
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	TOOSHLIGHT REQUIRED COMPONENTS AND ACCESSORIES	TO BE COMPATIBLE WITH A FALCON D271 TO CONECT TO LIGHT ABOVE DOOR	UNF	MIS

3 Hardware Group No. 26

4 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S LAT	626	SCH
1	EA	TURN I/S X OCC IND	D271	626	FAL
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	TOOSHLIGHT REQUIRED COMPONENTS AND ACCESSORIES	TO BE COMPATIBLE WITH A FALCON D271 TO CONECT TO LIGHT ABOVE DOOR	UNF	MIS

5 Hardware Group No. 27

6 Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	L9040 LATA L583-363 L283-722	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

7 Hardware Group No. 28

8 Provide each SGL door(s) with the following:

	QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
	1	EA CONT. HINGE	224XY	628	IVE
	1	EA DBL CYL DEADBOLT	B662J	626	SCH
	2	EA FSIC CORE	23-030 EV29 T	626	SCH
	2	EA FSIC CORE	23-030 ICX	622	SCH
	1	EA PUSH PLATE	8200 4" X 16"	630	IVE
	1	EA PULL PLATE	8305 10" 4" X 16"	630	IVE
	1	EA SURFACE CLOSER	4040XP SHCUSH	689	LCN
	1	EA ARMOR PLATE	8400 36" X 2" LDW B-CS	630	IVE
1	Hardware Group No. 29				
2	Provide each SGL door(s) with the following:				
	QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
	1	EA CONT. HINGE	224XY	628	IVE
	1	EA PASSAGE SET	ND10S LAT	626	SCH
	1	EA SURFACE CLOSER	4040XP SHCUSH	689	LCN
	1	EA ARMOR PLATE	8400 36" X 2" LDW B-CS	630	IVE
3	Hardware Group No. 30				
4	Provide each PR door(s) with the following:				
	QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
	6	EA HINGE	5BB1 4 X 4	652	IVE
	2	EA ROLLER LATCH	RL32	626	IVE
	2	EA SINGLE DUMMY TRIM	ND170 LAT	626	SCH
	2	EA OH STOP & HOLDER	450F	630	GLY
5	Hardware Group No. 31				
6	Provide each PR door(s) with the following:				
	QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
	6	EA HINGE	5BB1 4.5 X 4.5	652	IVE
	2	EA DOUBLE DUMMY TRIM	ND172 LAT	626	SCH
	2	EA ROLLER LATCH	RL32	626	IVE
	2	EA OH STOP & HOLDER	450F	630	GLY
7	Hardware Group No. 32				
8	Provide each SGL door(s) with the following:				
	QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
	1	EA CONT. HINGE	224XY	628	IVE
	1	EA STOREROOM LOCK	ND80JD LAT	626	SCH
	1	EA FSIC CORE	23-030 EV29 T	626	SCH
	1	EA FSIC CORE	23-030 ICX	622	SCH
	1	EA ARMOR PLATE	8400 36" X 2" LDW B-CS	630	IVE
	1	EA WALL STOP	WS406/407CCV	630	IVE
9	Hardware Group No. 33				
10	Provide each SGL door(s) with the following:				
	QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
	1	EA CONT. HINGE	112XY	628	IVE
	1	EA NARROW STILE MORTISE LOCK BODY	DORM - CORRIDOR LOCK 8824	626	ACC
	1	EA CORRIDOR LOCK	L9456L LATA LLL LLL LESS LOCK CASE L583-363	626	SCH
	1	EA FSIC CORE	23-030 EV29 T	626	SCH
	1	EA FSIC CORE	23-030 ICX	622	SCH
	1	EA MORTISE CYLINDER	30-137 X L583-255 36-083 36-082-037	626	SCH
	1	EA FLOOR STOP	FS410	626	IVE

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- 1 Hardware Group No. 34
- 2 Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1 EA	NOTE	ALL HARDWARE BY DOOR SUPPLIER	UNF	B/O

- 3 **END OF SECTION**

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SECTION 08 80 00
GLAZING

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30 **PART 1 - GENERAL**

31 **1.1 RELATED DOCUMENTS**

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

34 **1.2 SUMMARY**

- 35 A. Section includes:
36 1. Glass for windows, doors, interior borrowed lites, storefront framing, glazed curtain walls, skylights.
37 2. Glazing sealants and accessories.
38 B. Related Sections:
39 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

40 **1.3 COORDINATION**

- 41 A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face
42 clearances, and adequate sealant thicknesses, with reasonable tolerances.

43 **1.4 ACTION SUBMITTALS**

- 44 A. Product Data: For each type of product.
45 B. Sustainable Design Submittals:
46 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and
47 cost.
48 C. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
49 D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same
50 designations indicated on Drawings.
51 E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design
52 criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their
53 preparation.

- 1 **1.5 INFORMATIONAL SUBMITTALS**
- 2 A. Preconstruction adhesion and compatibility test report.
- 3 **1.6 QUALITY ASSURANCE**
- 4 A. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021
- 5 to conduct the testing indicated.
- 6 **1.7 PRECONSTRUCTION TESTING**
- 7 A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing
- 8 accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
- 9 1. Testing is not required if data are submitted based on previous testing of current sealant products
- 10 and glazing materials matching those submitted.
- 11 **1.8 WARRANTY**
- 12 A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass
- 13 units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects
- 14 developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated
- 15 glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications
- 16 of deterioration in coating.
- 17 1. Warranty Period: 10 years from date of Substantial Completion.
- 18 B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units
- 19 that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects
- 20 developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated
- 21 glass contrary to manufacturer's written instructions. Defects include edge separation, delamination
- 22 materially obstructing vision through glass, and blemishes exceeding those allowed by referenced
- 23 laminated-glass standard.
- 24 1. Warranty Period: 10 years from date of Substantial Completion.
- 25 C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units
- 26 that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of
- 27 hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning
- 28 insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision
- 29 by dust, moisture, or film on interior surfaces of glass.
- 30 1. Warranty Period: 10 years from date of Substantial Completion.

31 **PART 2 - PRODUCTS**

- 32 **2.1 MANUFACTURERS**
- 33 A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may
- 34 be incorporated into the Work include, but are not limited to the following:
- 35 1. Guardian Industries Corp.; SunGuard.
- 36 2. Oldcastle BuildingEnvelope™.
- 37 3. PPG Flat Glass; PPG Industries, Inc.
- 38 4. Viracon, Inc.
- 39 **2.2 PERFORMANCE REQUIREMENTS**
- 40 A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality
- 41 Requirements," to design glazing.
- 42 B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions
- 43 indicated determined according to the International Building Code and ASTM E 1300.
- 44 1. Design Wind Pressures: As indicated on Drawings.
- 45 2. Design Snow Loads: 40 PSF.
- 46 3. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the
- 47 glass.
- 48 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within
- 49 individual glass lites.
- 50 C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201,
- 51 Category II.
- 52 D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as
- 53 indicated in manufacturer's published test data, based on procedures indicated below:

- 1 1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2
- 2 computer program, expressed as Btu/sq. ft. x h x deg F.
- 3 2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to
- 4 NFRC 200 and based on LBL's WINDOW 5.2 computer program.
- 5 3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

6 2.3 GLASS PRODUCTS, GENERAL

- 7 A. Glazing Publications: Comply with published recommendations of glass product manufacturers and
- 8 organizations below unless more stringent requirements are indicated. See these publications for glazing
- 9 terms not otherwise defined in this Section or in referenced standards.
 - 10 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 - 11 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped
 - 12 Glazing Guidelines."
 - 13 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 - 14 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for
 - 15 Sealed Insulating Glass Units for Commercial and Residential Use."
- 16 B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label
- 17 of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate
- 18 manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- 19 C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component
- 20 lite of units with appropriate certification label of IgCC.
- 21 D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with
- 22 performance requirements and is not less than the thickness indicated.
- 23 E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float
- 24 glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-
- 25 strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide
- 26 fully tempered float glass.

27 2.4 GLASS PRODUCTS

- 28 A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- 29 B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless
- 30 otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- 31 C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A
- 32 (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- 33 D. Ceramic-Coated Vision Glass: ASTM C 1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as
- 34 indicated, Quality-Q3; and complying with Specification No. 95-1-31 in GANA's "Engineering Standards
- 35 Manual."

36 2.5 LAMINATED GLASS

- 37 A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor,
- 38 or lose physical and mechanical properties after fabrication and installation.
 - 39 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's
 - 40 written instructions.
 - 41 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with
 - 42 requirements.
 - 43 3. Interlayer Color: Clear unless otherwise indicated.

44 2.6 INSULATING GLASS

- 45 A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a
- 46 dehydrated interspace, qualified according to ASTM E 2190.
 - 47 1. Sealing System: Dual seals.
 - 48 2. Gas: Argon.
 - 49 3. Spacer: Thermally broken Aluminum with black anodic finish.

50

- 1 **2.7 GLAZING SEALANTS**
2 A. General:
3 1. Compatibility: Compatible with one another and with other materials they contact, including glass
4 products, seals of insulating-glass units, and glazing channel substrates, under conditions of service
5 and application, as demonstrated by sealant manufacturer based on testing and field experience.
6 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing
7 sealants suitable for applications indicated and for conditions existing at time of installation.
8 3. Sealant shall have a VOC content of 250 g/L or less.
9 4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
10 B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS,
11 Class 100/50, Use NT or as recommended by glass manufacturer for glazing application.
- 12 **2.8 GLAZING TAPES**
13 A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape;
14 nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as
15 recommended in writing by tape and glass manufacturers for application indicated; and complying with
16 ASTM C 1281 and AAMA 800 for products indicated below:
17 1. AAMA 804.3 tape, where indicated.
18 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
19 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
20 B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both
21 surfaces; and complying with AAMA 800 for the following types:
22 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
23 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of
24 liquid sealant.
- 25 **2.9 MISCELLANEOUS GLAZING MATERIALS**
26 A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
27 B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
28 C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to
29 maintain glass lites in place for installation indicated.
30 D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
31 E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to
32 control glazing sealant depth and otherwise produce optimum glazing sealant performance.

33 **PART 3 - EXECUTION**

- 34 **3.1 GLAZING, GENERAL**
35 A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing
36 materials, unless more stringent requirements are indicated, including those in referenced glazing
37 publications.
38 B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project
39 site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other
40 imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
41 C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction
42 testing.
43 D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless
44 otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel
45 bead.
46 E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
47 F. Provide spacers for glass lites where length plus width is larger than 50 inches.
48 G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing
49 channel, as recommended in writing by glass manufacturer and according to requirements in referenced
50 glazing publications.
51

- 1 **3.2 TAPE GLAZING**
2 A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or
3 protrude slightly above sightline of stops.
4 B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them
5 fit opening.
6 C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing
7 joints by applying tapes to jambs, then to heads and sills.
8 D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in
9 tapes with compatible sealant approved by tape manufacturer.
10 E. Apply heel bead of elastomeric sealant.
11 F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense
12 compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket
13 applications at corners and work toward centers of openings.
14 G. Apply cap bead of elastomeric sealant over exposed edge of tape.

- 15 **3.3 GASKET GLAZING (DRY)**
16 A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with
17 allowance for stretch during installation.
18 B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints
19 miter cut and bonded together at corners.
20 C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly
21 against soft compression gasket by inserting dense compression gaskets formed and installed to lock in
22 place against faces of removable stops. Start gasket applications at corners and work toward centers of
23 openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass.
24 Seal gasket joints with sealant recommended by gasket manufacturer.
25 D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly
26 against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying
27 pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without
28 developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
29 E. Install gaskets so they protrude past face of glazing stops.

- 30 **3.4 SEALANT GLAZING (WET)**
31 A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and
32 glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel
33 and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in
34 position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
35 B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant
36 to glass and channel surfaces.
37 C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

- 38 **3.5 CLEANING AND PROTECTION**
39 A. Immediately after installation remove nonpermanent labels and clean surfaces.
40 B. Protect glass from contact with contaminating substances resulting from construction operations. Examine
41 glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during
42 construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
43 1. If, despite such protection, contaminating substances do come into contact with glass, remove
44 substances immediately as recommended in writing by glass manufacturer. Remove and replace
45 glass that cannot be cleaned without damage to coatings.
46 C. Remove and replace glass that is damaged during construction period.

- 47 **3.6 MONOLITHIC GLASS SCHEDULE**
48 A. Glass Type (**GL-4**): Clear float glass, tempered where indicated on the drawings.
49 1. Minimum Thickness: Refer to Material Tag index.
50 2. Safety glazing required where indicated on the drawings.
51

- 1 **3.8 INSULATING GLASS SCHEDULE**
2 A. Glass Type (**GL-1,-2**): Low-E-coated, clear insulating glass curtain wall.
3 1. Basis-of-Design Product: Oldcastle: Solarban 60.
4 2. Overall Unit Thickness: 1 inch.
5 3. Minimum Thickness of Each Glass Lite: 6 mm.
6 4. Outdoor Lite: 1/4 inch Heat-strengthened float glass.
7 5. Interspace Content: Argon.
8 6. Indoor Lite: 1/4 inch Annealed float glass.
9 7. Low-E Coatings: Hard low-e on second surface.
10 8. Winter Nighttime U-Factor: 0.19 btu/hr-sf-F maximum.
11 9. Summer Daytime U-Factor: 0.16 btu/hr-sf-F maximum.
12 10. Visible Light Transmittance: 60 percent minimum
13 11. Exterior reflectance: 12%.
14 12. Solar Heat Gain Coefficient: 0.26 maximum.
15 13. Safety glazing required where noted on the drawings as GL-2.

- 16 **3.9 INSULATING-LAMINATED-GLASS SCHEDULE**
17 A. Glass Type (**GL-3**): Low-E-coated, clear insulating laminated glass.
18 1. Basis-of-Design Product: Oldcastle: Solarban 60 Starphire.
19 2. Overall Unit Thickness: 1-3/16 inch.
20 3. Minimum Thickness of Outdoor Lite: 6 mm.
21 4. Outdoor Lite: Fully tempered float glass.
22 5. Interspace Content: Argon.
23 6. Indoor Lite: 9/16 inch clear PPG Starphire laminated glass with two plies of fully tempered float glass.
24 a. Minimum Thickness of Each Glass Ply: 6 mm.
25 b. Interlayer Thickness: 0.090 inch.
26 7. Low-E Coating: Pyrolytic on third surface.
27 8. Winter Nighttime U-Factor: 0.28 btu/hr-sf-F maximum.
28 9. Summer Daytime U-Factor: 0.27 btu/hr-sf-F maximum.
29 10. Visible Light Transmittance: 46 percent minimum.
30 11. Solar Heat Gain Coefficient: 0.32 maximum.
31 12. Safety glazing required.

32 **END OF SECTION**

SECTION 08 91 19
FIXED LOUVERS

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18 **PART 1 - GENERAL**

19 **1.1 RELATED DOCUMENTS**

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

22 **1.2 SUMMARY**

- 23 A. Section includes fixed, extruded-aluminum louvers.
24 B. Related Requirements:
25 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

26 **1.3 ACTION SUBMITTALS**

- 27 A. Product Data: For each type of product.
28 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models
29 with appropriate AMCA Certified Ratings Seals.
30 2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
31 and cost.
32 3. Product Data: Certification of product manufacturing origin.
33 B. Sustainability:
34 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
35 and cost.
36 2. Regional Materials: Products shall be manufactured within 500 miles of Project site.
37 3. Product Data: Certification of product manufacturing origin.
38 C. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments
39 to other work. Show frame profiles and blade profiles, angles, and spacing.
40 D. Samples: For each type of metal finish required.
41 E. Delegated-Design Submittal: For louvers indicated to comply with structural performance requirements,
42 including analysis data signed and sealed by the qualified professional engineer responsible for their
43 preparation.

44 **1.4 INFORMATIONAL SUBMITTALS**

- 45 A. Product Test Reports: Based on tests performed according to AMCA 500-L.
46 B. Windborne-debris-impact-resistance test reports.

47 **PART 2 - PRODUCTS**

48 **2.1 PERFORMANCE REQUIREMENTS**

- 49 A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified
50 professional engineer, using structural performance requirements and design criteria indicated.

- 1 B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and
2 stresses within limits and under conditions indicated without permanent deformation of louver components,
3 noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and
4 anchors. Wind pressures shall be considered to act normal to the face of the building.
5 1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
6 2. Wind Loads: Determine loads based on a uniform pressure acting inward or outward.
7 a. Refer to drawings.
8 C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by
9 testing manufacturer's stock units identical to those provided, except for length and width according to
10 AMCA 500-L.

11 **2.2 FIXED, EXTRUDED-ALUMINUM LOUVERS**

- 12 A. Horizontal, Drainable-Blade Louver (**LOUV-1**):
13 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
14 a. Airolite Company, LLC (The).
15 b. Greenheck Fan Corporation.
16 c. Ruskin Company.
17 B. Basis of Design: Fixed-Blade Extruded-Aluminum Louvers: Horizontal Drainable-Blade Louvers as
18 manufactured by The Airolite Co.
19 1. Product: K6776:
20 a. Depth: 6 inches (152 mm) nominal louver depth.
21 b. Type: Concealed mullion.
22 c. Percent Free Area: 54%.
23 d. Beginning Point of Water Penetration: 1,250 fpm (6.35 m/s).
24 e. Air Volume Flow Rate at Beginning Point of Water Penetration: 10,700 cfm (5.06 m³/s).
25 f. Pressure Drop at Beginning Point of Water Penetration: 0.18 in. H₂O (0.045 kPa).
26 g. Blade Thickness: 0.081 in (2 mm) 0.125 in (3 mm).
27 h. Frame Thickness: 0.081 in (2 mm) 0.125 in (3 mm).
28 2. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
29 3. Recycled Content: 50% pre-consumer material.
30 4. Regional Materials: Products shall be manufactured within 500 miles of Project site.

31 **2.3 LOUVER SCREENS**

- 32 A. General: Provide screen at each exterior louver.
33 1. Screen Location for Fixed Louvers: Exterior face.
34 2. Screening Type: Bird screening.
35 B. Louver Screen Frames: Same type and form of metal as indicated for louver to which screens are
36 attached.
37 C. Louver Screening for Aluminum Louvers:
38 1. Bird Screening: Aluminum, 1/2-inch-square mesh, 0.063-inch wire.

39 **2.4 MATERIALS**

- 40 A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.
41 B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise
42 recommended by metal producer for required finish.
43 C. Fasteners: Use types and sizes to suit unit installation conditions.
44 1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
45 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
46 3. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
47 4. For fastening stainless steel, use 300 series stainless-steel fasteners.
48 5. For color-finished louvers, use fasteners with heads that match color of louvers.
49 D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

50 **2.5 FABRICATION**

- 51 A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for
52 fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
53 B. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless
54 otherwise indicated or size of louver assembly makes bolted connections between frame members
55 necessary.

- 1 **2.6 ALUMINUM FINISHES**
2 A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and
3 containing not less than [50] [70] percent PVDF resin by weight in both color coat and clear topcoat.
4 Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin
5 manufacturers' written instructions.
6 1. Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As
7 selected by Architect from manufacturer's full range] <Insert color and gloss>.

8 **PART 3 - EXECUTION**

9 **3.1 INSTALLATION**

- 10 A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
11 B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required
12 to protect metal surfaces and to make a weathertight connection.
13 C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
14 D. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or
15 dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by
16 separating surfaces with waterproof gaskets or nonmetallic flashing.

17 **3.2 ADJUSTING**

- 18 A. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If
19 results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace
20 with new units.

21 **END OF SECTION**

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SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

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17 **PART 1 - GENERAL**

18 **1.1 RELATED DOCUMENTS**

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

21 **1.2 SUMMARY**

- 22 A. Section Includes:
23 1. Non-load-bearing steel framing systems for interior partitions.
24 2. Suspension systems for interior ceilings and soffits.
25 B. Related Requirements:
26 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

27 **1.3 ACTION SUBMITTALS**

- 28 A. Product Data: For each type of product.
29 B. Sustainable Design Submittals:
30 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
31 and cost.
32 2. Regional Materials: Products shall be manufactured within 500 miles of Project site.
33 3. Product Data: Certification of product manufacturing origin.

34 **1.4 INFORMATIONAL SUBMITTALS**

- 35 A. Evaluation reports for firestop tracks.

36 **PART 2 - PRODUCTS**

37 **2.1 PERFORMANCE REQUIREMENTS**

- 38 A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-
39 bearing steel framing, provide materials and construction identical to those tested in assembly indicated,
40 according to ASTM E 119 by an independent testing agency.
41 B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those
42 tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an
43 independent testing agency.

44 **2.2 FRAMING SYSTEMS**

- 45 A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer
46 recycled content not less than 35 percent.
47 1. Minimum Recycled Content: 34.9%.
48 2. Minimum Post-Consumer Recycled Content: 24.3%.
49 3. Minimum Pre-Consumer (Post Industrial) Recycled Content: 9.4%.
50

- 1 B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
- 2 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise
- 3 indicated.
- 4 2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40, hot-
- 5 dip galvanized unless otherwise indicated.
- 6 C. Studs and Runners: ASTM C 645.
- 7 1. Steel Studs and Runners:
- 8 a. Minimum Base-Metal Thickness: 0.0179 inch.
- 9 b. Depth: As indicated on Drawings.
- 10 D. Slip-Type Head Joints: Where indicated, provide the following:
- 11 1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to
- 12 interior partition framing resulting from deflection of structure above; in thickness not less than
- 13 indicated for studs and in width to accommodate depth of studs.
- 14 E. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement
- 15 of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less
- 16 than indicated for studs and in width to accommodate depth of studs.
- 17 F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
- 18 G. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-
- 19 wide flanges.
- 20 1. Depth: 1-1/2 inches.
- 21 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- 22 H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of
- 23 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness
- 24 indicated.

25 **2.3 FURRING**

- 26 A. Refer to Drawings for type and size.
- 27 B. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
- 28 1. Minimum Base-Metal Thickness: 0.0296 inch.
- 29 2. Depth: As indicated on Drawings.
- 30 C. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
- 31 1. Configuration: Asymmetrical.
- 32 D. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
- 33 1. Depth: As indicated on Drawings.
- 34 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel
- 35 thickness of 0.0329 inch.
- 36 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or
- 37 double strand of 0.048-inch-diameter wire.

38 **2.4 SUSPENSION SYSTEMS**

- 39 A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double
- 40 strand of 0.048-inch-diameter wire.
- 41 B. Hanger Attachments to Concrete:
- 42 1. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength
- 43 design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the
- 44 design load, as determined by testing per ASTM E 488/E 488M conducted by a qualified testing
- 45 agency.
- 46 2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated
- 47 from corrosion-resistant materials, with allowable load capacities calculated according to ICC-
- 48 ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190
- 49 conducted by a qualified testing agency.
- 50 C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- 51 D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- 52 E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and
- 53 minimum 1/2-inch-wide flanges.
- 54 1. Depth: 2-1/2 inches.
- 55

- 1 F. Furring Channels (Furring Members):
2 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges,
3 3/4 inch deep.
4 2. Steel Studs and Runners: ASTM C 645.
5 a. Minimum Base-Metal Thickness: 0.0269 inch.
6 b. Depth: As indicated on Drawings or as required to meet deflection requirements.
7 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
8 a. Minimum Base-Metal Thickness: 0.0179 inch.
9 4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
10 a. Configuration: Asymmetrical .

11 **2.5 AUXILIARY MATERIALS**

- 12 A. General: Provide auxiliary materials that comply with referenced installation standards.
13 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other
14 properties required to fasten steel members to substrates.
15 B. Isolation Strip at Exterior Walls: Provide one of the following:
16 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
17 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration
18 without foam displacement, 1/8 inch thick, in width to suit steel stud size.

19 **PART 3 - EXECUTION**

20 **3.1 INSTALLATION, GENERAL**

- 21 A. Installation Standard: ASTM C 754.
22 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing
23 installation.
24 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to
25 framing installation.
26 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to
27 framing installation.
28 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing
29 installation.
30 B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
31 C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars,
32 toilet accessories, furnishings, or similar construction.
33 D. Install bracing at terminations in assemblies.
34 E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame
35 both sides of joints independently.

36 **3.2 INSTALLING FRAMED ASSEMBLIES**

- 37 A. Install framing system components according to spacings indicated, but not greater than spacings required
38 by referenced installation standards for assembly types.
39 B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls,
40 install isolation strip between studs and exterior wall.
41 C. Install studs so flanges within framing system point in same direction.
42 D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or
43 substrates above suspended ceilings except where partitions are indicated to terminate at suspended
44 ceilings. Continue framing around ducts that penetrate partitions above ceiling.
45 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce
46 joints at tops of framing systems that prevent axial loading of finished assemblies.
47 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner
48 track section (for cripple studs) at head and secure to jamb studs.
49 a. Install two studs at each jamb unless otherwise indicated.
50 b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance
51 from jamb stud to allow for installation of control joint in finished assembly.
52 c. Extend jamb studs through suspended ceilings and attach to underside of overhead
53 structure.
54 3. Other Framed Openings: Frame openings other than door openings the same as required for door
55 openings unless otherwise indicated. Install framing below sills of openings to match framing
56 required above door heads.

- 1 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly
2 indicated and support closures and to make partitions continuous from floor to underside of solid
3 structure.
- 4 a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated
5 assembly indicated.
- 6 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- 7 6. Curved Partitions:
8 a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
9 b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On
10 straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.
- 11 E. Direct Furring:
12 1. Screw to wood framing.
13 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or
14 powder-driven fasteners spaced 24 inches o.c.
- 15 F. Z-Shaped Furring Members:
16 1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with
17 Z-shaped furring members spaced 24 inches o.c. unless noted otherwise.
18 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete
19 stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches
20 o.c.
21 3. At exterior corners, attach wide flange of furring members to wall with short flange extending
22 beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of
23 attached channel. At interior corners, space second member no more than 12 inches from corner
24 and cut insulation to fit.
- 25 G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from
26 the plane formed by faces of adjacent framing.

27 3.3 INSTALLING SUSPENSION SYSTEMS

- 28 A. Install suspension system components according to spacings indicated, but not greater than spacings
29 required by referenced installation standards for assembly types.
- 30 B. Isolate suspension systems from building structure where they abut or are penetrated by building structure
31 to prevent transfer of loading imposed by structural movement.
- 32 C. Suspend hangers from building structure as follows:
33 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum
34 that are not part of supporting structural or suspension system.
35 a. Splay hangers only where required to miss obstructions and offset resulting horizontal
36 forces by bracing, countersplaying, or other equally effective means.
37 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that
38 interfere with locations of hangers required to support standard suspension system members,
39 install supplemental suspension members and hangers in the form of trapezes or equivalent
40 devices.
41 a. Size supplemental suspension members and hangers to support ceiling loads within
42 performance limits established by referenced installation standards.
43 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye
44 screws, or other devices and fasteners that are secure and appropriate for substrate, and in a
45 manner that will not cause hangers to deteriorate or otherwise fail.
46 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts,
47 eye screws, or other devices and fasteners that are secure and appropriate for structure and
48 hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
49 5. Do not attach hangers to steel roof deck.
50 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend
51 through forms.
52 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
53 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- 54 D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- 55 E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured
56 lengthwise on each member that will receive finishes and transversely between parallel members that will
57 receive finishes.

58 END OF SECTION

SECTION 09 29 00
GYPSUM BOARD

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20 **PART 1 - GENERAL**

21 **1.1 RELATED DOCUMENTS**

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

24 **1.2 SUMMARY**

- 25 A. Section Includes:
 - 26 1. Interior gypsum board.
 - 27 2. Tile backing panels.
- 28 B. Related Requirements:
 - 29 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

30 **1.3 ACTION SUBMITTALS**

- 31 A. Product Data: For each type of product.
- 32 B. Sustainable Design Submittals:
 - 33 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
 - 34 and cost.
 - 35 2. Product Certificates: For regional materials, indicating location of material manufacturer and point
 - 36 of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for
 - 37 each regional material.
 - 38 3. Product Data: For adhesives and sealants, indicating VOC content.

39 **PART 2 - PRODUCTS**

40 **2.1 PERFORMANCE REQUIREMENTS**

- 41 A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and
- 42 construction identical to those tested in assembly indicated according to ASTM E 119 by an independent
- 43 testing agency.
- 44 B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those
- 45 tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an
- 46 independent testing agency.

47 **2.2 GYPSUM BOARD, GENERAL**

- 48 A. Gypsum board products shall be GREENGUARD Gold Certified.
- 49 B. Regional Materials: Products shall be manufactured within 500 miles of Project site from materials that
- 50 have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

- 1 C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that
2 correspond with support system indicated.

3 **2.3 INTERIOR GYPSUM BOARD**

- 4 A. Gypsum Wallboard: ASTM C 1396/C 1396M (**GWB-1**).
5 B. Gypsum Board, Type X: ASTM C 1396/C 1396M (**GWB-2**).
6 1. Thickness: 5/8 inch.
7 2. Long Edges: Tapered.
8 C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
9 1. Thickness: 1/2 inch.
10 2. Long Edges: Tapered.

11 **2.4 TILE BACKING PANELS**

- 12 A. Cementitious Backer Units (**GWB-3**): ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with
13 manufacturer's standard edges.
14 1. Thickness: 5/8 inch.
15 2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

16 **2.5 TRIM ACCESSORIES**

- 17 A. Interior Trim - General: ASTM C 1047.
18 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced
19 galvanized-steel sheet.
20 2. Shapes:
21 a. Cornerbead.
22 b. Bullnose bead.
23 c. LC-Bead: J-shaped; exposed long flange receives joint compound.
24 d. L-Bead: L-shaped; exposed long flange receives joint compound.
25 e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
26 f. Expansion (control) joint.
27 3. Interior Trim – Specialty (**JOINT-1 through 4**):
28 a. : Refer to Material ID List.
29 4. Interior Trim – Specialty Trim (**TRIM#**):
30 a. DRYWALL END CAP TRIM (**TRIM-1**):
31 1) Fry Reglet or Approved Equal.
32 2) Style: DMEC-7250
33 3) Color: Painted To Match Wall;
34 4) Trim For Top of Demising Walls
35 b. DRYWALL Z-TRIM REVEAL (**TRIM-2**):
36 1) TRIM-TEX or approved equal.
37 2) Style: Mud-in reveal, Z profile
38 3) Product: 5810T
39 4) Dimensions: 5/8 inch drywall, 1/2 inch reveal
40 B. Picture Hanging Reveal (ART-1):
41 1. Basis of Design: Fry DA.10 with 50 quantity of DRMH-50 Reveal Picture Hanger.
42 a. Style: DA-10 RECESSED PICTURE HANGING SYSTEM
43 b. Color: Match wall.
44 c. Accessories: DRMH-50, QTY (20);

45 **2.6 JOINT TREATMENT MATERIALS**

- 46 A. General: Comply with ASTM C 475/C 475M.
47 B. Joint Tape:
48 1. Interior Gypsum Board: Paper.
49 2. Exterior Gypsum Soffit Board: Paper.
50 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
51 4. Tile Backing Panels: As recommended by panel manufacturer.
52 C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other
53 compounds applied on previous or for successive coats.
54 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use
55 setting-type taping compound.
56 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges,
57 use setting-type taping compound.

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- 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 high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

- 1 D. Joint Compound for Tile Backing Panels:
2 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
3 2. Cementitious Backer Units: As recommended by backer unit manufacturer.
- 4 **2.7 AUXILIARY MATERIALS**
- 5 A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's
6 written instructions.
- 7 B. Polyethylene Vapor Retarders: ASTM D 4397, 6-mil- (0.15-mm-) thick sheet, with maximum permeance
8 rating of 0.1 perm (5.7 ng/Pa x s x sq. m).
- 9 C. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to
10 continuous substrate.
11 1. Adhesives shall have a VOC content of 50 g/L or less.
- 12 D. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
13 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112
14 inch thick.
15 2. For fastening cementitious backer units, use screws of type and size recommended by panel
16 manufacturer.
- 17 E. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by
18 combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
19 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
20 2. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content
21 not less than 50 percent.
- 22 F. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with
23 ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and
24 openings in building construction as demonstrated by testing representative assemblies according to
25 ASTM E 90.
26 1. Sealant shall have a VOC content of 250 g/L or less.
- 27 G. For backbox putty, select one of the following, including all manufacturer-recommended accessories, in
28 conformance with Division 7 - Sealants:
29 1. SpecSeal SSP Intumescent Putty, Specified Technologies, Inc., Somerville, NJ.
30 2. IsoBacker, Kinetics Noise Products.
31 3. Firestop Putty Pads, Acoustical Solutions.
- 32 H. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

33 **PART 3 - EXECUTION**

34 **3.1 APPLYING AND FINISHING PANELS**

- 35 A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
36 B. Comply with ASTM C 840.
37 C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide
38 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are
39 exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
40 D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels.
41 Otherwise, attach trim according to manufacturer's written instructions.
42 E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
43 F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to
44 receive tape.
45 G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
46 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
47 2. Level 2: Panels that are substrate for tile.
48 3. Level 3: not required.
49 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
50 a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
51 5. Level 5: [not required].
52 a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
53 H. Cementitious Backer Units: Finish according to manufacturer's written instructions.

54 **3.2 ACOUSTIC SEPERATION**

- 55 A. Electrical boxes, electrical conduits, pipes, ducts, structure and other penetrations of walls, floors and
56 slabs within Acoustically Sensitive Rooms, Electrical Equipment Rooms of all types, Mechanical

- 1 Equipment Rooms of all types and Elevator Equipment Rooms of all types shall be caulked to achieve an
2 airtight and light tight closure.
3 1. For electrical boxes, audio and video panels, fire extinguisher cabinets, HVAC system control
4 devices, and similar elements recessed into acoustically-sensitive partitions or where backboxes
5 serving adjacent rooms but located in the same partition within the same stud space, wrap entire
6 concealed surface with putty to form airtight, light-tight closure of the entire surface of the backbox
7 extending to and bonding with the back face of the adjacent gypsum board or other wall cladding.
8 Install in compliance with manufacturer's recommendations.
9 2. Provide intumescent putty at fire rated wall assemblies. Refer to Section 07 84 43 – Joint
10 Firestopping.

11 **3.3 PROTECTION**

- 12 A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and
13 other causes during remainder of the construction period.
14 B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

15 **END OF SECTION**

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SECTION 09 30 13
CERAMIC TILING

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19 **PART 1 - GENERAL**

20 **1.1 RELATED DOCUMENTS**

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

23 **1.2 SUMMARY**

- 24 A. Section Includes:
25 1. Glazed wall tile.

26 **1.3 ACTION SUBMITTALS**

- 27 A. Product Data: For each type of product.
28 B. Sustainable Design Submittals:
29 1. Product Data: For adhesives, indicating VOC content.
30 C. Samples:
31 1. Each type and composition of tile and for each color and finish required.
32 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of
33 tile and for each color and finish required.

34 **1.4 INFORMATIONAL SUBMITTALS**

- 35 A. Qualification Data: For Installer.

36 **1.5 MAINTENANCE MATERIAL SUBMITTALS**

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

41 **1.6 QUALITY ASSURANCE**

- 42 A. Installer Qualifications:
43 1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of
44 Excellence member of the Tile Contractors' Association of America.
45 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
46 3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by
47 the U.S. Department of Labor as Journeyman Tile Layers.

1 **PART 2 - PRODUCTS**

2 **2.1 PRODUCTS, GENERAL**

- 3 A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types,
4 compositions, and other characteristics indicated.
5 B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI
6 standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods
7 specified in tile installation schedules, and other requirements specified.

8 **2.2 TILE PRODUCTS**

- 9 A. Ceramic Tile Type (CT-1): glazed ceramic wall tile.
10 1. Basis of Design: Nemo Seta
11 2. Color: 10 Olivia
12 3. Size: 1/2 inch x1/2 inch tile in 12 inches by 12 inches mesh mosaic tile.
13 4. Performance:
14 a. Variance: V1.
15 b. Material: Ceramic.
16 c. Finishes: Matte.
17 d. Thickness: 7.2 mm.
18 e. ASTM Wet: 0.73.
19 f. ASTM Dry: 0.73.
20 g. Stain Resistant: Yes.
21 h. Frost Resistant: Yes.
22 i. Chemical Resistant: GB Minimum.
23 j. Breaking Strength: >1800N.
24 k. Absorption: ≤ 1%.
25 B. Ceramic Tile Type (CT-2): glazed ceramic wall tile.
26 1. Basis of Design: Fireclay Tile Picket
27 2. Color: Spruce Gloss V3
28 3. Size: 9-13/16 inches aby 3-3/4 inches.
29 4. Body: Recycled clay.
30 5. Pattern: Braid border.

31 **2.3 SETTING MATERIALS**

- 32 A. Latex-Portland Cement Mortar (Thinset): ANSI A118.4.
33 1. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
34 2. Provide prepackaged, dry-mortar mix combined with liquid-latex additive at Project site.
35 3. For wall applications, provide nonsagging mortar.

36 **2.4 GROUT MATERIALS**

- 37 A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored
38 aggregate as required to produce color indicated.
39 B. Standard Cement Grout: ANSI A118.6.
40 1. Polymer Type: Liquid-latex form for addition to prepackaged dry-grout mix.

41 **PART 3 - EXECUTION**

42 **3.1 EXAMINATION**

- 43 A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance
44 with requirements for installation tolerances and other conditions affecting performance of the Work.
45 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with
46 tile-setting materials, including curing compounds and other substances that contain soap, wax, oil,
47 or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations
48 indicated.
49 B. Proceed with installation only after unsatisfactory conditions have been corrected.

50 **3.2 PREPARATION**

- 51 A. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile
52 units taken from one package show same range of colors as those taken from other packages and match

1 approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before
2 installing.

3 **3.3 CERAMIC TILE INSTALLATION**

- 4 A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation
5 methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications
6 for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile
7 installation schedules, and apply to types of setting and grouting materials used.
- 8 B. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible
9 surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit
10 tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap
11 tile.
- 12 C. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in
13 both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are
14 less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- 15 D. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
16 1. Glazed Wall Tile: 1/8 inch.
- 17 E. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

18 **END OF SECTION**

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SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

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28 **PART 1 - GENERAL**

- 29 **1.1 RELATED DOCUMENTS**
30 A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and
31 Division 01 Specification Sections, apply to this Section.
- 32 **1.2 SUMMARY**
33 A. Section includes:
34 1. Acoustical panels and exposed suspension systems for interior ceilings (ACT-2).
35 2. Acrylic panel for vendor canopy stall (ACRYLIC-1).
36 B. Related Requirements:
37 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
38 2. Section 05 12 13 "Architecturally Exposed Structural Steel Framing" supporting slotted channel grid
39 for vendor stall canopy.
40 3. Section 05 45 00 "Equipment Support Systems" for slotted channel grid suspended from
41 architecturally exposed steel framing.
42 4. Section 05 75 00 "Decorative Formed Metal" for vendor stall canopy panels.
43 5. Section 09 91 23 "Interior Painting" for finish painting requirements.
- 44 **1.3 PREINSTALLATION MEETINGS**
45 A. Preinstallation Conference: Conduct conference at Project site.
- 46 **1.4 ACTION SUBMITTALS**
47 A. Product Data: For each type of product.
48 B. Sustainable Design Submittals:
49 1. Recycled content.
50 2. Laboratory Test Reports: For ceiling products, indicating compliance with requirements for low-
51 emitting materials.
52 3. Sustainability Certifications of specified product level compliance.
53 C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on
54 Samples of sizes indicated below:

- 1 1. Acoustical Panels: Set of full-size Samples of each type, color, pattern, and texture.
- 2 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each
- 3 type, finish, and color.

4 1.5 INFORMATIONAL SUBMITTALS

- 5 A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown
- 6 and coordinated with each other, using input from installers of the items involved:
- 7 1. Ceiling suspension-system members.
- 8 2. Structural members to which suspension systems will be attached.
- 9 3. Method of attaching hangers to building structure.
- 10 a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose
- 11 installation is specified in other Sections.
- 12 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do
- 13 not permit installation of hanger wires at required spacing.
- 14 5. Size and location of initial access modules for acoustical panels.
- 15 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
- 16 a. Lighting fixtures.
- 17 b. Diffusers.
- 18 c. Grilles.
- 19 d. Speakers.
- 20 e. Sprinklers.
- 21 f. Access panels.
- 22 g. Perimeter moldings.
- 23 7. Minimum Drawing Scale: 1/8 inch = 1 foot.
- 24 B. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and
- 25 witnessed by a qualified testing agency.

26 1.6 CLOSEOUT SUBMITTALS

- 27 A. Maintenance Data: For finishes to include in maintenance manuals.

28 1.7 MAINTENANCE MATERIAL SUBMITTALS

- 29 A. Furnish extra materials, from the same product run, that match products installed and that are packaged
- 30 with protective covering for storage and identified with labels describing contents.
- 31 1. Refer to Section 01 78 43 - Spare Parts and Extra Materials for submittal procedures
- 32 2. Acoustical Ceiling Units (ACT-2): Full-size panels equal to 2 percent of quantity installed.

33 1.8 QUALITY ASSURANCE

- 34 A. Mockups: Build assembly mockups of acrylic ceiling panel (ACRYLIC-1) and supporting elements to set
- 35 quality standards for fabrication and installation of entire assembly.
- 36 1. Build mockup of typical portion of complete composite vendor stall canopy as shown on Drawings.
- 37 Provide supporting steel grid.
- 38 2. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete
- 39 a mockup submittal for review.
- 40 3. Subject to compliance with requirements, approved mockups may become part of the completed
- 41 Work if undisturbed at time of Substantial Completion.

42 1.9 DELIVERY, STORAGE, AND HANDLING

- 43 A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them
- 44 in a fully enclosed, conditioned space where they will be protected against damage from moisture,
- 45 humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- 46 B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture
- 47 content.

48 1.10 FIELD CONDITIONS

- 49 A. Environmental Limitations: Do not install acoustical panel ceilings until wet-work in spaces is complete and
- 50 dry, work above ceilings is complete.

1 **PART 2 - PRODUCTS**

2 **2.1 MANUFACTURERS**

- 3 A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
4 may be incorporated into the Work include, but are not limited to the following:
5 1. Armstrong World Industries, Inc.
6 2. CertainTeed Corporation.
7 3. United States Gypsum Company.
8 B. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system
9 from single source from single manufacturer.

10 **2.2 PERFORMANCE REQUIREMENTS**

- 11 A. Ceiling products shall comply with the requirements of the California Department of Public Health's
12 "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor
13 Sources Using Environmental Chambers."
14 B. Meets USDA/FSIS guidelines for use in food processing areas.
15 C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify
16 products with appropriate markings of applicable testing agency.
17 1. Flame-Spread Index: Class A according to ASTM E 1264.
18 2. Flame Spread Index 25 or less. Smoke Developed Index 50 or less.

19 **2.3 ACOUSTICAL PANELS (ACT-2)**

- 20 A. Type and Form: Type IX—Mineral base with scrubbable pigmented or clear finish. Form 2—Water felted.
21 Pattern: G (smooth).
22 B. Basis of Design: Armstrong Kitchen Zone 24 inches x 24 inches panels with Prelude® XL 15/16 inch
23 suspension system.
24 C. Characteristics
25 1. Classification: Wet-formed mineral fiber (Class A).
26 2. Finish: Factory-applied vinyl latex paint.
27 3. Color: White
28 4. LR: 0.89.
29 5. NRC: N/A.
30 6. CAC: 33.
31 7. AC: 170.
32 8. Edge/Joint Detail: Square.
33 9. Modular Size: 24 inches x 24 inches x 5/8 inch.
34 10. Humidity/Sag Resistance.
35 11. Mold/Mildew Protection.
36 12. VOC Emissions: GREENGUARD Gold Certified.
37 13. Recycled Content: 36%.
38 14. Suspension System: 15/16 inch faced suspension system.
39 D. 30-Year Limited System Warranty against visible sag, mold, and mildew.

40 **2.4 CEILING PANEL (ACRYLIC-1):**

- 41 A. Extruded Polymethyl Methacrylate (PMMA) Solid Sheets.
42 B. Basis of Design: 10 mm thick solid clear acrylic. Plazcryn as manufactured by Polygal.
43 C. Manufacturer's interconnecting aluminum profiles for PC multiwall sheets and systems.
44 1. Provide with edge trim. Refer to Drawings.

45 **2.5 METAL SUSPENSION SYSTEM**

- 46 A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension
47 system and accessories according to ASTM C 635/C 635M and designated by type, structural
48 classification, and finish indicated.
49 B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less
50 than 25 percent.
51 C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from
52 cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating
53 designation; with prefinished 15/16-inch-wide metal caps on flanges.
54 1. Structural Classification: Intermediate-duty system.

- 1 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
- 2 3. Face Design: Flat, flush.
- 3 4. Cap Material: Cold-rolled steel.
- 4 5. Cap Finish: Painted white.

5 **2.6 ACCESSORIES**

- 6 A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct
- 7 Hung," unless otherwise indicated. Comply with seismic design requirements.
- 8 a. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B 633,
- 9 Class SC 1 (mild) service condition.
- 10 B. Wire Hangers, Braces, and Ties: Provide wires as follows:
- 11 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
- 12 2. Size: Wire diameter sufficient for its stress at three times hanger design load
- 13 (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less
- 14 than 0.106-inch- diameter wire.
- 15 C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- 16 D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- 17 E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel
- 18 sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-
- 19 inch-diameter bolts.

20 **2.7 METAL EDGE MOLDINGS AND TRIM**

- 21 A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated,
- 22 manufacturer's standard moldings for edges and penetrations that comply with seismic design
- 23 requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges
- 24 of suspension-system runners.
- 25 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match
- 26 width and configuration of exposed runners unless otherwise indicated.
- 27 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same
- 28 depth and width as that formed between edge of panel and flange at exposed suspension member.
- 29 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit
- 30 penetration exactly.

31 **2.8 ACOUSTICAL SEALANT**

- 32 A. Acoustical Sealant: As specified in Section 07 92 19 "Acoustical Joint Sealants."

33 **PART 3 - EXECUTION**

34 **3.1 EXAMINATION**

- 35 A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings
- 36 attach or abut, with Installer present, for compliance with requirements specified in this and other Sections
- 37 that affect ceiling installation and anchorage and with requirements for installation tolerances and other
- 38 conditions affecting performance of acoustical panel ceilings.
- 39 B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or
- 40 mold damaged.
- 41 C. Proceed with installation only after unsatisfactory conditions have been corrected.

42 **3.2 PREPARATION**

- 43 A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite
- 44 edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and
- 45 comply with layout shown on reflected ceiling plans.
- 46 B. Layout openings for penetrations centered on the penetrating items.
- 47

1 **3.3 INSTALLATION**

- 2 A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
- 3 B. Application: ACT-2
- 4 1. Not designed for use in close proximity to commercial grease ducts.
- 5 C. Suspend ceiling hangers from building's structural members and as follows:
- 6 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum
- 7 that are not part of supporting structure or of ceiling suspension system.
- 8 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by
- 9 bracing, countersplaying, or other equally effective means.
- 10 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that
- 11 interfere with location of hangers at spacings required to support standard suspension-system
- 12 members, install supplemental suspension members and hangers in form of trapezes or equivalent
- 13 devices.
- 14 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of
- 15 three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices
- 16 that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to
- 17 age, corrosion, or elevated temperatures.
- 18 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members,
- 19 by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the
- 20 structure to which hangers are attached and the type of hanger involved. Install hangers in a
- 21 manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated
- 22 temperatures.
- 23 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying
- 24 channels or other supplemental support for attachment of hanger wires.
- 25 7. Space hangers not more than 48 inches o.c. along each member supported directly from hangers
- 26 unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
- 27 8. Size supplemental suspension members and hangers to support ceiling loads within performance
- 28 limits established by referenced standards.
- 29 D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where
- 30 necessary to conceal edges of acoustical panels.
- 31 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings
- 32 before they are installed.
- 33 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3
- 34 inches from ends. Miter corners accurately and connect securely.
- 35 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- 36 E. Install suspension-system runners so they are square and securely interlocked with one another. Remove
- 37 and replace dented, bent, or kinked members.
- 38 F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and
- 39 edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
- 40 1. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm
- 41 contact with top surface of runner flanges.
- 42 2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel
- 43 surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

44 **3.4 ERECTION TOLERANCES**

- 45 A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-
- 46 cumulative.
- 47 B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a
- 48 tolerance of 1/8 inch in 12 feet, non-cumulative.

49 **3.5 CLEANING**

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

55 **END OF SECTION**

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SECTION 09 65 13
RESILIENT BASE AND ACCESSORIES

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9 2.2 THERMOSET-RUBBER BASE (RB-1)
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12 3.1 PREPARATION
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14 3.4 CLEANING AND PROTECTION

15 **PART 1 - GENERAL**

16 **1.1 RELATED DOCUMENTS**

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

19 **1.2 SUMMARY**

- 20 A. Section Includes:
21 1. Resilient base.
22 B. Related Requirements:
23 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

24 **1.3 ACTION SUBMITTALS**

- 25 A. Product Data: For each type of product.
26 B. Sustainable Design Submittals:
27 1. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing
28 system, documentation including printed statement of VOC content.
29 a. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-
30 emitting materials.
31 2. Health Product Declaration. Submit complete Health Product Declaration with full disclosure of
32 known hazards in compliance with the Health Product Declaration open Standard.
33 3. Certification compliant with California Department of Public Health (CDPH) – FloorScore®.
34 C. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

35 **PART 2 - PRODUCTS**

36 **2.1 PERFORMANCE REQUIREMENTS**

37 **2.2 THERMOSET-RUBBER BASE (RB-1)**

- 38 A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
39 may be incorporated into the Work include, but are not limited to, the following:
40 1. Johnsonite; A Tarkett Company: Baseworks.
41 B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
42 1. Style and Location:
43 a. Straight: Provide in areas with carpet.
44 b. Cove: Provide in areas with hard flooring.
45 2. TVOC Emissions: 0.5 mg/m³ or less.
46 3. Thickness: 0.125 inch.
47 4. Height: 4 inches.
48 5. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.
49 6. Outside Corners: Job formed or preformed.
50 7. Inside Corners: Job formed or preformed.

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1
2 8. Colors: Refer to Material DI List

- 1 **2.3 INSTALLATION MATERIALS**
2 A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended
3 hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for
4 applications indicated.
5 B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and
6 substrate conditions indicated.
7 1. Adhesives shall have a VOC content of 50] g/L or less and 60 g/L or less for rubber stair treads.
8 C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to
9 fill nosing substrates that do not conform to tread contours.
10 D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread
11 manufacturer.

12 **PART 3 - EXECUTION**

- 13 **3.1 PREPARATION**
14 A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient
15 products.
16 B. Do not install resilient products until they are the same temperature as the space where they are to be
17 installed.

- 18 **3.2 RESILIENT BASE INSTALLATION**
19 A. Comply with manufacturer's written instructions for installing resilient base.
20 B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other
21 permanent fixtures in rooms and areas where base is required.
22 C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces
23 aligned.
24 D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact
25 with horizontal and vertical substrates.
26 E. Do not stretch resilient base during installation.
27 F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with
28 manufacturer's recommended adhesive filler material.
29 G. Preformed Corners: Install preformed corners before installing straight pieces.
30 H. Job-Formed Corners:
31 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less
32 than 6 inches in length.
33 a. Form without producing discoloration (whitening) at bends.
34 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less
35 than 3 inches in length.
36 a. Miter or cope corners to minimize open joints.

- 37 **3.3 CLEANING AND PROTECTION**
38 A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
39 B. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before
40 applying liquid floor polish.
41 1. Apply two coat(s).
42 C. Cover resilient products subject to wear and foot traffic until Substantial Completion.

43 **END OF SECTION**

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SECTION 09 67 23
RESINOUS FLOORING

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19 **PART 1 - GENERAL**

20 **1.1 SUMMARY**

- 21 A. Section includes:
22 1. Resinous flooring systems (**EPOXY-1**).
23 2. Concrete floor patch/sealer (**SL-1**).
24 3. Sealed cast in place concrete (**CONC-1**)
25 B. Related Requirements:
26 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
27 2. Section 03 30 00 "Cast-in-Place Concrete" for concrete forming and finishing to receive resinous
28 flooring.
29 3. Section 03 35 43 "Polished Concrete Finishing" for sealer components as part of the floor polishing
30 system.
31 4. Section 09 91 23 "Interior Painting" for resinous floor painting of floor graphics.

32 **1.2 PREINSTALLATION MEETINGS**

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

34 **1.3 ACTION SUBMITTALS**

- 35 A. Product Data: For each type of product.
36 B. Sustainability:
37 1. Indoor Environmental Quality
38 a. Product Data for Credit IEQ 4.2: For interior field-applied traffic coatings, documentation
39 including printed statement of VOC content.
40 C. Samples: For each type of exposed finish required.

41 **1.4 INFORMATIONAL SUBMITTALS**

- 42 A. Qualification Data: For Installer.
43 1. Product Test Reports: Test data for traffic coating products and traffic coating system, by qualified
44 testing agency, indicating proposed traffic coating meets performance requirements.
45 2. Warranty: Sample of unexecuted manufacturer and installer special warranties.
46 3. Field quality control reports.

47 **1.5 CLOSEOUT SUBMITTALS**

- 48 A. Maintenance data.

49 **1.6 MAINTENANCE MATERIAL SUBMITTALS**

- 50 A. Furnish extra materials, from the same product run, that match products installed and that are packaged
51 with protective covering for storage and identified with labels describing contents.
52 1. Refer to Section 01 78 43 - Spare Parts and Extra Materials for submittal procedures.

1 2. CONC-1: Provide repair kit for 900 sq ft of each material and color applied.

2 **1.7 QUALITY ASSURANCE**

3 A. Installer Qualifications:

4 1. Applicator regularly engaged, for a minimum of 5 years, in application of resinous flooring systems
5 of similar type to that specified.

6 2. Employ persons trained for application of resinous flooring systems.

7 B. Mockups: Apply mockups of each coating system (COAT-#) system indicated and each color and finish
8 selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic
9 effects and set quality standards for materials and execution.

10 1. Mockup: Refer to Section 01 43 39 – Mockups for description of construction required to complete
11 a mockup submittal for review.

12 2. Architect will select one surface to represent surfaces and conditions for application of each finish
13 system.

14 a. Existing EPOXY tie into new EPOXY-1.

15 b. Epoxy system to demonstrate traffic coating pattern

16 c. Other Items: Architect will designate items or areas required.

17 3. Final approval of color selections will be based on mockups.

18 a. If preliminary color selections are not approved, apply additional mockups of additional
19 colors selected by Architect at no added cost to Owner.

20 4. Approval of mockups does not constitute approval of deviations from the Contract Documents
21 contained in mockups unless Architect specifically approves such deviations in writing.

22 a. Retain subparagraph below if the intention is to make an exception to the default
23 requirement in Section 01 40 00 "Quality Requirements" for demolishing and removing
24 mockups.

25 5. Subject to compliance with requirements, approved mockups may become part of the completed
26 Work if undisturbed at time of Substantial Completion.

27 **1.8 FIELD CONDITIONS**

28 A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate
29 temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring
30 application.

31 B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting
32 conditions during resinous flooring application.

33 C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless
34 manufacturer recommends a longer period.

35 **1.9 WARRANTY**

36 A. Manufacturer's Warranty: Manufacturer agrees to repair or replace traffic coating that fails in materials or
37 workmanship within specified warranty period.

38 1. Failures include, but are not limited to, the following:

39 a. Adhesive or cohesive failures.

40 b. Abrasion or tearing failures.

41 c. Surface crazing or spalling.

42 d. Intrusion of water, oils, gasoline, grease, salt, deicer chemicals, or acids into deck substrate.

43 2. Warranty Period: Five years from date of Substantial Completion.

44 **PART 2 - PRODUCTS**

45 **2.1 RESINOUS FLOORING SYSTEM (EPOXY-1)**

46 A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based
47 monolithic floor surfacing designed to produce a seamless floor and integral cove base where scheduled.

48 B. Basis-of-Design Product: Subject to compliance with requirements, provide Tennant Flake DB as
49 manufactured by Tennant Coatings Incorporated or comparable product by one of the following:

50 1. Advanced Polymer Technology Corporation.

51 2. BASF Corporation; Construction Systems.

52 3. Neogard; a division of Jones-Blair, Inc.

53 4. Tremco Incorporated.

54 C. Tennant Flake DB.

55 1. First Broadcast Coat with decorative vinyl flake (micro): Eco-MPE pigmented, 10-12 mils.

- 1 2. Second Broadcast Coat with decorative vinyl flake (micro): Eco-MPE, 15 mils.
- 2 3. Grout Coat: Eco-TCP, 15 mils.
- 3 4. Topcoat: Eco-TCP, 8 mils.
- 4 5. Color: As selected by Architect from manufacturer's full range.
- 5 D. Eco-MPE: A neutral, two-component, high solids epoxy.
- 6 1. Percent Solids, by weight (by volume), ASTM D1475, A + B: 95.45 (94.56).
- 7 2. Volatile Organic Compound-VOC, ASTM D3960, Mixed A + B: 0.41 lb./gal (49 g/L).
- 8 3. Abrasion Resistance, mg loss, Taber Abraser, C-17 Taber Abrasion Wheel, 1,000 gram load, 1,000
- 9 revolutions, ASTM D4060: 83.1.
- 10 4. Coefficient of Friction-COF, James Friction Tester, ASTM D2047: 0.59-0.62.
- 11 5. Adhesion to Concrete, ASTM D5441: 732 psi (4.48 MPa) concrete failed.
- 12 6. Adhesion to Concrete, ASTM D7234: 450 psi (3.10 MPa) concrete failed.
- 13 7. Compressive Strength, ASTM D695: 13,500 psi (93.079 MPa).
- 14 8. Tensile Strength, ASTM D2370: 8,000 psi (55.158 MPa).
- 15 9. Percent Elongation, ASTM D2370: 5.
- 16 10. Shore D Hardness, ASTM D2240: 80-85 @ 0 sec, 75-80 @ 15 sec.
- 17 E. Eco-TCP: A two-component, high solids, thick coat polyaspartic.
- 18 1. Percent Solids, by weight (by volume), ASTM D1475, A + B: 91.59 (91.47).
- 19 2. Volatile Organic Compounds-VOC, ASTM 3960: 0.30 lb./gal (37 g/L).
- 20 3. Abrasion Resistance, mg loss, Taber Abraser (CS-17 Taber Abrasion Wheel, 1,000 gram load,
- 21 1,000 revolutions), ASTM D4060: 43.
- 22 4. Wet Static Coefficient of Friction, BOT 3000, ANSI/NFSI B101.1: 0.99.
- 23 5. Resistance to Yellowing, As measured using ASTM D2244 after 1000 consecutive hours UV
- 24 exposure in QUV, ASTM G154, <20 increase of yellowing units (CIE Lab Δb
- 25 6. Tensile Strength, ASTM D2370: 6,913 psi (47.66 MPa).
- 26 7. Percent Elongation, ASTM D2370: 8.
- 27 8. Thermal Stability/Heat resistance, MIL-D-3134J Section 4.6.3: No slip/flow, softening or change in
- 28 appearance.
- 29 9. Water Absorption, 24-hour immersion, ASTM C413: 0.2 percent weight increase.
- 30 F. Decorative Flake: Water-based resin material, inorganic minerals, additives, integrally pigmented.
- 31 1. Shape: Random.
- 32 2. Size: Micro.
- 33 3. Surface Texture: Smooth.
- 34 4. Color: Selected by Architect.

35 **2.2 CONCRETE FLOOR PATCH/ SEALER (SL-1).**

- 36 A. Existing floor repair and finish:
- 37 B. Basis-of-Design Product: Subject to compliance with requirements, provide Eco-HF 250 Eco-FPE as
- 38 manufactured by Tennant Coatings Incorporated or comparable product by one of the following:
- 39 1. Advanced Polymer Technology Corporation.
- 40 2. BASF Corporation; Construction Systems.
- 41 3. Neogard; a division of Jones-Blair, Inc.
- 42 4. Tremco Incorporated.
- 43 A. Patching:
- 44 1. Eco-HF 250: High-performance, three-component epoxy resurfacers designed for trowel-patching
- 45 potholes in concrete floors.
- 46 a. Abrasion Resistance, mg loss ASTM D4060* 85 Taber Abraser.
- 47 b. Coefficient of Friction (COF) James Friction Tester ASTM D2047 >0.7.
- 48 c. Compressive Strength, psi (kPa) ASTM D695 15,000 (103,500).
- 49 d. Shore D Hardness ASTM D2240 80-85 @ 0 sec. 75-80 @ 15 sec
- 50 e. UV/Light Stability: Will turn yellow or amber over time.
- 51 f. VOC Compliance: Solvent-free; 0.0 VOC.
- 52 2. Eco-FPE: Three component, quick-setting epoxy resurfacers, is designed for trowel-patching small
- 53 cracks and holes in concrete floors.
- 54 a. Compressive Strength, psi (kPa) ASTM D695 >15,000 (103,500)
- 55 b. Shore D Hardness ASTM D2240 80-85 @ 0 sec 75-80 @ 15 sec
- 56 c. UV/Light Stability Will turn yellow or amber over time.
- 57 d. VOC Compliance: Solvent-free; 0.0 VOC.
- 58 B. Finish:
- 59 1. As selected by Architect from standard and custom colors. Intent is to match existing.
- 60 C. Sealing:
- 61 1. Eco-PT: Epoxy topcoat applied to patching products to provide a sealed traffic ready floor.

- 1
- 2
2. Complies with SCAQMD VOC regulations--<100 g/L.
3. Application Thickness, wet mils [mm] - 5-8 (0.13-0.20 mils) per coat. One coat.

3 **2.3 SEALED CAST IN PLACE CONCRETE (CONC-1):**

- 4 1. Finish: Eco-PT: Epoxy topcoat used over primer and build coat to provide a sealed traffic ready
- 5 floor. Application Thickness, wet mils [mm] - 5-8 (0.13-0.20 mils) per coat. One coat.
- 6 2. Primer: Eco-MPE. 3 mils (0.08 mm) wet/dry film. One coat.
- 7 3. Build Coat: Eco-MPE. 10 mils (0.25 mm) wet/dry film. One coat.
- 8

1 **PART 3 - EXECUTION**

2 **3.1 PREPARATION**

- 3 A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for
4 substrate indicated. Provide clean, dry substrate for resinous flooring application.
- 5 B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing
6 compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous
7 flooring.
- 8 1. Roughen concrete substrates as follows:
- 9 a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the
10 dispensed shot within the apparatus, and recirculates the shot by vacuum pickup. Steel shot
11 blast concrete to a minimum surface profile of ICRI 310.2R, CSP 5.
- 12 b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more
13 stringent.
- 14 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written
15 instructions.
- 16 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels
17 according to manufacturer's written instructions.
- 18 4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range.
19 Perform tests recommended by manufacturer. Proceed with application only after substrates pass
20 testing.
- 21 C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to
22 manufacturer's written instructions.
- 23 D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's
24 written instructions.

25 **3.2 APPLICATION**

- 26 A. Apply components of resinous flooring system according to manufacturer's written instructions to produce
27 a uniform, monolithic wearing surface of thickness indicated.
- 28 1. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with
29 resinous flooring manufacturer's written instructions.
- 30 B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- 31 C. Integral Cove Base (where scheduled – refer to drawings): Apply cove base mix to wall surfaces before
32 applying flooring. Apply according to manufacturer's written instructions. Round internal and external
33 corners.
- 34 1. Integral Cove Base: 4 inches high.
- 35 D. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for
36 flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel
37 marks and roughness using method recommended by manufacturer.
- 38 1. Aggregates: Broadcast aggregates at rate recommended by manufacturer and, after resin is cured,
39 remove excess aggregates to provide surface texture indicated.
- 40 E. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in
41 writing by manufacturer and to produce wearing surface indicated.
- 42 F. Protect resinous flooring from damage and wear during the remainder of construction period.

43 **END OF SECTION**

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SECTION 09 68 13
TILE CARPETING

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20 **PART 1 - GENERAL**

21 **1.1 RELATED DOCUMENTS**

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

24 **1.2 SUMMARY**

- 25 A. Section includes modular carpet tile.

26 **1.3 PREINSTALLATION MEETINGS**

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

28 **1.4 ACTION SUBMITTALS**

- 29 A. Product Data: For each type of product.
- 30 B. Sustainable Design Submittals:
 - 31 1. Product Data: For adhesives, indicating VOC content.
 - 32 1. Health Product Declaration. Submit complete Health Product Declaration with full disclosure of
 - 33 known hazards in compliance with the Health Product Declaration open Standard.
 - 34 2. Laboratory Test Reports: For flooring products, indicating compliance with requirements for testing
 - 35 and product requirements of CRI's "Green Label Plus" testing program.
 - 36 3. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-
 - 37 emitting materials.
 - 38 4. Green Circle Certified statement of environmental facts.
- 39 C. Shop Drawings: For carpet tile installation, plans showing the following:
 - 40 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are
 - 41 required in carpet tiles.
 - 42 2. Carpet tile type, color, and dye lot.
 - 43 3. Type of subfloor.
 - 44 4. Type of installation.
 - 45 5. Pattern of installation.
 - 46 6. Pattern type, location, and direction.
 - 47 7. Pile direction.
 - 48 8. Type, color, and location of edge, transition, and other accessory strips.
 - 49 9. Transition details to other flooring materials.
- 50 D. Samples: For each exposed product and for each color and texture required.
- 51

1 **1.5 INFORMATIONAL SUBMITTALS**

- 2 A. Product test reports.
3 B. Sample warranty.

4 **1.6 CLOSEOUT SUBMITTALS**

- 5 A. Maintenance data.

6 **1.7 QUALITY ASSURANCE**

- 7 A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the
8 Commercial II certification level.

9 **1.8 MAINTENANCE MATERIAL SUBMITTALS**

- 10 A. Furnish extra materials, from the same product run, that match products installed and that are packaged
11 with protective covering for storage and identified with labels describing contents.
12 1. Refer to Section 01 78 43 - Spare Parts and Extra Materials for submittal procedures.
13 2. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated.

14 **1.9 WARRANTY**

- 15 A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile
16 installation that fail in materials or workmanship within specified warranty period.
17 1. Warranty Period: 10 years from date of Substantial Completion.

18 **PART 2 - PRODUCTS**

19 **2.1 WALK OFF CARPET TILE (CPT-1)**

- 20 A. Manufacturer: Mohawk
21 B. Style: First Step II, GT315/QL315
22 C. Color: 989 OBSIDIAN;
23 D. Construction:
24 1. Size: 24" x 24" (.6096 m x .6096 m)
25 2. Tufted Pile Weight: 38.0 oz. per sq. yd. (1288 g/m²)
26 3. Product Type: Modular-Walk Off
27 4. Construction: Tufted
28 5. Surface Texture: Performance Loop Pile
29 6. Gauge: 5/32 (25.2 rows per 10 cm)
30 7. Density: 6,739
31 8. Weight Density: 256,082
32 9. Stitches Per Inch: 8.5 (33.46 per 10 cm)
33 10. Finished Pile Thickness: .203" (5.16 mm)
34 11. Dye Method: Solution Dyed
35 12. Backing Material: EcoFlex ICT
36 13. Fiber Type: Duracolor® Premium Nylon
37 14. Fiber Technology:
38 15. Duracolor® by Mohawk Group's Stain Resistant
39 16. System. Passes GSA requirements for permanent stain resistant carpet.
40 17. Pattern Repeat: Not Applicable
41 18. Installation Method: Quarter Turn, Monolithic, Brick Ashlar, Vertical Ashlar, Multi Directional
42 19. GSA Stain Release Rating: Pass
43 20. Stain Release Technology: Permanent, Built into Fiber
44 21. Soil Release Technology: Sentry Soil Protection
45 22. Foot Traffic Recommendation TARR: Severe
46 E. Sustainability:
47 1. IAQ Green Label Plus: CRI Green Label Plus GLP1098.
48 2. Pre-Consumer Recycled Content: 44%.
49 3. NSF 140: EcoFlex ICT - NSF 140 Gold.
50 4. Declare Label: Declared.
51 F. Performance:
52 1. Static: AATCC-134 under 3.5 KV.
53 2. Flammability: ASTM E 648 Class 1 (Glue Down).

- 1 3. Smoke Density: ASTM E 662 Less than 450.
- 2 **2.2 WALK OFF CARPET TILE (CPT-2)**
- 3 A. Manufacturer: Interface.
- 4 B. Style: Step It Up
- 5 C. Color: 106335 Coal.
- 6 D. Installation: Ashlar.
- 7 E. Construction:
- 8 1. Product Construction: Tufted Textured Loop.
- 9 2. Yarn System: Post-Consumer Content Nylon.
- 10 3. Yarn Manufacturer: Universal.
- 11 4. Dye Method: 100% Solution Dyed.
- 12 5. Soil/Stain Protection: Protekt².
- 13 6. Preservative Protection: Intersept.
- 14 7. Tufted Yarn Weight: 18 oz/yd² 610 g/m².
- 15 8. Machine Gauge: 1/12 in 39.4 ends/10cm.
- 16 9. Pile Height: 0.14 in 3.6 mm.
- 17 10. Pile Thickness: 0.084 in 2.1 mm.
- 18 11. Stitches: 10.8 /in 42.5 ends/10cm.
- 19 12. Pile Density: 7,714 oz/yd³ 286,033.4 g/m³.
- 20 13. Backing: GlasBacRE
- 21 14. Size: 19.69 in x 19.69 in 50cm x 50cm.
- 22 F. Sustainability:
- 23 1. Carbon Footprint 6.58 Kg CO /M.
- 24 2. Total Recycled Content 72%.
- 25 3. Recycled Content (Post Industrial) 71%.
- 26 4. Recycled Content (Post Consumer) 1%.
- 27 5. Indoor Air Quality Green Label Plus #GLP0820, CDPH 01350.
- 28 6. Free of Added Formaldehyde, Heavy Metals and OrthoPhthalates, Fluorinated Chemicals (PFAS),
- 29 and Halogenated Flame Retardants.
- 30 7. Disclosure of Environmental Impacts: Environmental Product Declaration.
- 31 8. Disclosure of Product Ingredients: Health Product Declaration.
- 32 9. Environmental Certifications (Green Circle Certified Environmental Facts NSF/ANSI 140): Gold.
- 33 10. Backing (Nylon 6 or Nylon 6,6 on GlasBacRE): Recycled Content – 87% (65%/19% - pre/post)
- 34 G. Performance:
- 35 1. Flooring Radiant Panel (ASTM E-648): Passes.
- 36 2. Smoke Density (ASTM E 662): ≤ 450.
- 37 3. Flammability Passes Methenamine Pill Test (DOC-FF1-70).
- 38 4. Lightfastness (AATCC 16 - E): ≥ 4.0 @ 60 AFU's.
- 39 5. Static (AATCC - 134): < 3.0 KV.
- 40 6. Dimensional Stability AACHEN Din 54318: <.10%.
- 41 7. Traffic Classification: Heavy.
- 42 8. Fiber Modification Ratio: 1.7 to 1.9.
- 43 9. Preservative Efficacy (AATCC 174 Parts 2&3): 99% Reduction/No Mold 7 Days.
- 44 10. (ASTM E-2471) Complete Inhibition.
- 45 H. Warranty 15 Year Standard Carpet Warranty.
- 46 **2.3 INSTALLATION ACCESSORIES**
- 47 A. Carpet Accessory: Trim:
- 48 1. Transition Strip (**TRANS-3**): Refer to Material ID List and Drawings.
- 49 B. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation
- 50 provided or recommended by carpet tile manufacturer.
- 51 C. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and
- 52 subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are
- 53 recommended by carpet tile manufacturer for releasable installation.
- 54 1. Adhesives shall have a VOC content of 50 g/L or less.

1 **PART 3 - EXECUTION**

2 **3.1 PREPARATION**

- 3 A. General: Comply with CRI's "CRI Carpet Installation Standards" and with carpet tile manufacturer's written
4 installation instructions for preparing substrates indicated to receive carpet tile.
5 B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill
6 cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8
7 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required
8 by manufacturer's written instructions.
9 C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are
10 incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use
11 mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
12 D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

13 **3.2 INSTALLATION**

- 14 A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with
15 carpet tile manufacturer's written installation instructions.
16 B. Installation Method: As recommended in writing by carpet tile manufacturer.
17 C. Maintain dye-lot integrity. Do not mix dye lots in same area.
18 D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
19 E. Install pattern parallel to walls and borders.
20 F. Protect carpet tile against damage from construction operations and placement of equipment and fixtures
21 during the remainder of construction period. Use protection methods indicated or recommended in writing
22 by carpet tile manufacturer.

23 **END OF SECTION**

SECTION 09 84 36

SOUND-ABSORBING CEILING UNITS

PART 1 – GENERAL

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- 1.7 [DELIVERY, STORAGE, AND HANDLING](#)
- 1.8 [FIELD CONDITIONS](#)
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PART 2 – PRODUCTS

- 2.1 [ACOUSTICAL BLADE AND BAFFLE UNITS \(BAFL-1\)](#)

PART 3 – EXECUTION

- 1.1 [EXAMINATION](#)
- 1.2 [INSTALLATION](#)
- 1.3 [CLEANING](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes acoustical direct mount ceiling baffle units tested for acoustical performance
 - 1. Geometric shaped ceiling hung acoustical forms. **(BAFL-1)**.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

1.3 DEFINITIONS

- A. NRC: Noise reduction coefficient.
- B. SAA: Sound absorption average.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions.
- B. Samples: Submit samples: 6 inches x 6 inches (152 x 152 mm) for each ceiling unit type required, showing full range of exposed texture to be expected in completed work.
- C. Shop Drawings: Reflected ceiling plans coordinating penetrations and ceiling mounted items. Show the following details:
 - 1. Details and reflected ceiling plans for the installation of the geometric shaped acoustical modules.
 - 2. Clearly illustrate all components of the geometric shaped acoustical modules suspension and components
 - 3. System assembly details and connections to building components
 - 4. List of materials, dimensions, hanger fastenings and any special details
- D. Sustainability Submittals:
 - 1. Transparency: Material ingredient transparency certificate indicating removal of Red List Ingredients per LBCV3, Life Cycle impact information, Low-Emitting Materials, and Clean Air performance.
 - 2. Health Product Declaration (HPD). The end use product shall submit a published, complete Health Product Declaration with disclosure at a minimum of 1000ppm of known hazards in compliance with the Health Product Declaration open Standard.
 - 3. Life cycle analysis. Products that have communicated lifecycle data through Environmental Product Declarations (EPDs) will be preferred.

- 1 4. Declare Label. The end use product shall submit a published Declare label by the International
2 Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant
3 (less than 1% proprietary ingredients).

4 **1.6 INFORMATIONAL SUBMITTALS**

- 5 A. Sample Warranty: For special warranty.

6 **1.7 DELIVERY, STORAGE, AND HANDLING**

- 7 A. Comply with fabric and sound-absorbing ceiling unit manufacturers' written instructions for minimum and
8 maximum temperature and humidity requirements for shipment, storage, and handling.
9 B. Delivery: Deliver material in the manufacturer's original, unopened, undamaged containers with
10 identification labels intact.
11 C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and
12 at temperature and humidity conditions recommended by the manufacturer.

13 **1.8 FIELD CONDITIONS**

- 14 A. Environmental Limitations: Do not install sound-absorbing ceiling units until spaces are enclosed and
15 weathertight, wet work in spaces is complete and dry, work at and above ceilings is complete, and
16 ambient temperature and humidity conditions are maintained at the levels indicated for Project when
17 occupied for its intended use.
18 B. Air-Quality Limitations: Protect sound-absorbing ceiling units from exposure to airborne odors, such as
19 tobacco smoke, and install units under conditions free from odor contamination of ambient air.
20 C. Field Measurements: Verify locations of sound-absorbing ceiling units and actual dimensions of openings
21 and penetrations by field measurements before fabrication.

22 **1.9 MAINTENANCE MATERIAL**

- 23 A. Provide extra geometric shaped acoustical modules acoustical material, matching installed material in
24 manufacturer's original packages and clearly labeled as attic stock. Deliver extra stock to owner's
25 representative.
26 1. Panel material 5%.

27 **PART 2 - PRODUCTS**

28 **2.1 ACOUSTICAL BLADE AND BAFFLE UNITS (BAFL-1)**

- 29 A. Type: Hexagonally shaped cellular coffers:
30 1. Product: Drop Large as manufactured by TURF.
31 a. Content: Polyester (PET) felt, 60% pre-consumer recycled.
32 b. Felt Thickness: 9mm
33 c. Color: Refer to material ID List.
34 d. Fire Rating: ASTM E84 Class A.
35 e. Environmental Attributes:
36 1) 9mm PET felt board is made from 60% recycled polyester plastic, over 50% of which
37 come from recycled water bottles. TURF is pursuing product transparency for LEED
38 V4 MR Credit 4 Option 1, and MR Credit 3 Option 2 for recycled content. TURF is
39 pursuing a Declare Label for this product.
40 f. Sound Absorption: ASTM C423
41 1) NRC = 0.75 (Material)
42 2. Carrier: Slotted channel framing.
43 a. Product: UNISTRUT P1000T Standard.
44 b. Finish: Painted finish.
45 c. Color: Refer to material ID List.
46 3. Baffle Construction:
47 a. The Drop Baffle System is constructed from a single sheet of 3mm felt material draped on
48 both sides of 2 adhered 9mm stiffeners, creating a rain drop profile and a substantial air
49 gap. Each Drop Baffle boasts a .85 - 1.25 NRC rating and is made of 60% pre-consumer
50 recycled plastic.
51 b. The Drop Baffle pattern is made of six unique baffles installed in sequence. When mirrored,
52 the undulation repeats continuously.

1 **PART 3 - EXECUTION**

2 **3.1 EXAMINATION**

- 3 A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements,
4 installation tolerances, and other conditions affecting performance of sound-absorbing ceiling units.
5 B. Proceed with installation only after unsatisfactory conditions have been corrected.

6 **3.2 INSTALLATION**

- 7 A. All acoustical panels and suspension systems shall be installed in strict accordance with the
8 manufacturer's printed instructions and current recommendations.
9 B. Installed panels should be free from damage or defects
10 C. Deflection of any suspension component shall not exceed $\pm 1/8$ inch in 12.0 feet.

11 **3.3 CLEANING**

- 12 A. Clean acoustical ceiling including trim, edge moldings and suspension members pursuant to
13 manufacturer's recommendations. Remove and replace damaged components that cannot be restored.

14 **END OF SECTION**

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SECTION 09 91 13
EXTERIOR PAINTING

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19 **PART 1 - GENERAL**

20 **1.1 RELATED DOCUMENTS**

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

23 **1.2 SUMMARY**

- 24 A. Section includes surface preparation and the application of paint systems on the following exterior
25 substrates:
26 1. Steel and iron.
27 2. Galvanized metal.
28 B. Related Requirements:
29 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

30 **1.3 DEFINITIONS**

- 31 A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to
32 ASTM D 523.
33 B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
34 C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to
35 ASTM D 523.
36 D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
37 E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
38 F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

39 **1.4 ACTION SUBMITTALS**

- 40 A. Product Data: For each type of product. Include preparation requirements and application instructions.
41 1. Include printout of current "MPI Approved Products List" for each product category specified, with the
42 proposed product highlighted.
43 B. Sustainable Design Submittals:
44 1. Product Data: For paints and coatings, indicating VOC content complying with federal, state and local
45 regulations.
46 C. Samples: For each type of paint system and each color and gloss of topcoat.
47

1 **1.5 MAINTENANCE MATERIAL SUBMITTALS**

- 2 A. Furnish extra materials, from the same product run, that match products installed and that are packaged
3 with protective covering for storage and identified with labels describing contents.
4 1. Refer to Section 01 78 43 - Spare Parts and Extra Materials for submittal procedures
5 2. Paint: 5 percent, but not less than 1 gallon of each material and color applied.

6 **1.6 QUALITY ASSURANCE**

- 7 A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify
8 preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality
9 standards for materials and execution.
10 1. Architect will select one surface to represent surfaces and conditions for application of each paint
11 system.
12 a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
13 b. Other Items: Architect will designate items or areas required.
14 2. Final approval of color selections will be based on mockups.
15 a. If preliminary color selections are not approved, apply additional mockups of additional colors
16 selected by Architect at no added cost to Owner.

17 **PART 2 - PRODUCTS**

18 **2.1 MANUFACTURERS**

- 19 A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may
20 be incorporated into the Work include, but are not limited to the following:
21 1. Benjamin Moore & Co.
22 2. Dulux (formerly ICI Paints); a brand of AkzoNobel.
23 3. Sherwin-Williams Company (The).
24 4. Valspar Corporation - Architectural (Pro).
25 B. Products: Subject to compliance with requirements, available products that may be incorporated into the
26 Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category
27 indicated.

28 **2.2 PAINT, GENERAL**

- 29 A. Material Compatibility:
30 1. Materials for use within each paint system shall be compatible with one another and substrates
31 indicated, under conditions of service and application as demonstrated by manufacturer, based on
32 testing and field experience.
33 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers
34 for use in paint system and on substrate indicated.
35 B. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities
36 having jurisdiction and the following VOC content limits:
37 1. Flat Paints and Coatings: 50 g/L.
38 2. Nonflat Paints and Coatings: 50 g/L.
39 3. Dry-Fog Coatings: 150 g/L.
40 4. Primers, Sealers, and Undercoaters: 100 g/L.
41 5. Rust-Preventive Coatings: 100 g/L.
42 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
43 7. Pretreatment Wash Primers: 420 g/L.
44 8. Shellacs, Clear: 730 g/L.
45 9. Shellacs, Pigmented: 550 g/L.

46 **PART 3 - EXECUTION**

47 **3.1 EXAMINATION**

- 48 A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum
49 moisture content and other conditions affecting performance of the Work.
50 B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and
51 primers.
52 C. Proceed with coating application only after unsatisfactory conditions have been corrected.
53 1. Application of coating indicates acceptance of surfaces and conditions.

1 **3.2 PREPARATION**

- 2 A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting
3 Specification Manual" applicable to substrates and paint systems indicated.
4 B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be
5 painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied
6 protection before surface preparation and painting.
7 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that
8 were removed. Remove surface-applied protection.

9 **3.3 APPLICATION**

- 10 A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
11 B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller
12 tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

13 **3.4 CLEANING AND PROTECTION**

- 14 A. Protect work of other trades against damage from paint application. Correct damage to work of other trades
15 by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged
16 condition.
17 B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted
18 surfaces.

19 **3.5 EXTERIOR PAINTING SCHEDULE**

- 20 A. System: Two-part high solids, less than 100 g/L VOC, high build, fast drying, polyamide epoxy top coated
21 with a urethane.
22 B. Substrate: Steel – unprimed and galvanized surfaces
23 C. Surface Prep: SSPC-SP10/NACE 2.
24 D. Finish: Semi-gloss.
25 E. Coats: 2 (epoxy plus urethane topcoat).
26 F. PT-6:
27 1. Basis of Design: Macropoxy 646 Midcoat and Pigmented Acrolon 100 Topcoat as manufactured by
28 Sherwin Williams.
29 2. First Coat: Macropoxy 646-100 at 3 to 10 mils.
30 3. Second Coat: Acrolon 218 Polyurethane at 3 to 6 mils.
31 4. Color: (PT-6B) Traffic Gray B, Ral 7043;

32 **END OF SECTION**

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1 SECTION 09 91 23

2 INTERIOR PAINTING

3 PART 1 – GENERAL

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22 [3.4 FIELD QUALITY CONTROL](#)

23 [3.5 CLEANING AND PROTECTION](#)

24 [3.6 PAINT COLORS:](#)

25 PART 1 - GENERAL

26 1.1 RELATED DOCUMENTS

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

29 1.2 SUMMARY

- 30 A. Section includes surface preparation and the application of paint systems on the following interior new and
31 existing substrates:

- 32 1. Concrete.
- 33 2. Concrete masonry units (CMUs).
- 34 3. Steel and iron.
- 35 4. Wood.
- 36 5. Gypsum board.
- 37 6. Decorative floor painted graphics.

- 38 B. Related Requirements:

- 39 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
- 40 2. Section 02 41 19 "Selective Demolition" for cleaning of existing surfaces.
- 41 3. Section 05 12 13 "Architecturally Exposed Steel framing for surface prep.
- 42 4. Section 05 50 00 "Metal Fabrications" for shop priming.
- 43 5. Section 05 51 13 "Metal pan stairs" for shop priming.
- 44 6. Section 05 52 13 "Pipe and Tube Railings" for shop priming.
- 45 7. Section 05 73 00 "Decorative Metal Railings" for shop priming.
- 46 8. Section 06 40 23 "Interior Architectural Woodwork" for wood wall panels shop applied finishes.
- 47 9. Section 06 41 13 "Wood-Veneer-Faced Architectural Cabinets" for shop applied finishes.
- 48 10. Section 06 41 23 "Modular Casework Fabrications" for shop applied finishes.

1 **1.3 DEFINITIONS**

- 2 A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to
3 ASTM D 523.
- 4 B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to
5 ASTM D 523.
- 6 C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to
7 ASTM D 523.
- 8 D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to
9 ASTM D 523.
- 10 E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- 11 F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- 12 G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

13 **1.4 ACTION SUBMITTALS**

- 14 A. Product Data: For each type of product. Include preparation requirements and application instructions.
15 1. Include Printout of current "MPI Approved Products List" for each product category specified, with
16 the proposed product highlighted.
17 2. Indicate VOC content.
- 18 B. Sustainable Design Submittals:
19 1. Environmental Product Declarations (reference MRc2)
20 2. Material sourcing - leadership in extraction practices (reference MRc3)
21 3. Material ingredient reporting (reference MRc4)
22 4. Low-emitting materials (reference EQc2)
23 5. Living Building Challenge/ Red List Free (reference LBC)
24 6. Product Data: For paints and coatings, indicating VOC content.
25 7. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-
26 emitting materials.
- 27 C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
28 1. Submit Samples on rigid backing, 8 inches square.
29 2. Apply coats on Samples in steps to show each coat required for system.
30 3. Label each coat of each Sample.
31 4. Label each Sample for location and application area.
- 32 D. Product List: Cross-reference to paint system and locations of application areas. Use same designations
33 indicated on Drawings and in schedules. Include color designations.

34 **1.5 MAINTENANCE MATERIAL SUBMITTALS**

- 35 A. Furnish extra materials, from the same product run, that match products installed and that are packaged
36 with protective covering for storage and identified with labels describing contents.
37 1. Refer to Section 01 78 43 - Spare Parts and Extra Materials for submittal procedures
38 2. Paint: 5 percent, but not less than 1 gallon of each material and color applied.
39

1 **1.6 QUALITY ASSURANCE**

- 2 A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify
3 preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality
4 standards for materials and execution.
5 1. Architect will select one surface to represent surfaces and conditions for application of each paint
6 system.
7 a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
8 b. Traffic coating graphic pattern.
9 c. Other Items: Architect will designate items or areas required.
10 2. Final approval of color selections will be based on mockups.
11 a. If preliminary color selections are not approved, apply additional mockups of additional
12 colors selected by Architect at no added cost to Owner.
13 3. Approval of mockups does not constitute approval of deviations from the Contract Documents
14 contained in mockups unless Architect specifically approves such deviations in writing.
- 15 B. Assembly Mockup:
16 1. Coat vendor stall canopy mockup with **PT-7** as scheduled and indicated. Refer to mockup drawing.
- 17 C. Subject to compliance with requirements, approved mockups may become part of the completed Work if
18 undisturbed at time of Substantial Completion.

19 **1.7 DELIVERY, STORAGE, AND HANDLING**

- 20 A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures
21 continuously maintained at not less than 45 deg F.
22 1. Maintain containers in clean condition, free of foreign materials and residue.
23 2. Remove rags and waste from storage areas daily.

24 **1.8 FIELD CONDITIONS**

- 25 A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between
26 50 and 95 deg F.
- 27 B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above
28 the dew point; or to damp or wet surfaces.

29 **PART 2 - PRODUCTS**

30 **2.1 MANUFACTURERS**

- 31 A. Basis-of-Design Product: Subject to compliance with requirements, provide Benjamin Moore & Co. "Ultra
32 Spec" Interior Paint or comparable product by one of the following:
33 1. Sherwin Williams, ProMar® 200 Zero VOC1
34 2. Imperial Paints, LLC, Ecos Paints.
35 3. Glidden Professional.
36 4. Pratt & Lambert.

37 **2.2 PAINT, GENERAL**

- 38 A. Formulation:
39 1. Vehicle Type: 100% Acrylic Latex.
40 2. Pigment Type: Titanium Dioxide.
41 3. Volume Solids: 44%.
42

- 1 B. Certifications & Qualifications:
2 1. VOC compliant in all regulated areas.
3 a. Zero VOC according to EPA Method 24.
4 b. Zero Emissions (measured at 4 hours after application) according to ASTM Standard Guide
5 D 5116 and CDPH/EHLB/Standard Method v1.1
6 c. Class A (0-25) over non-combustible surfaces when tested in accordance with ASTM E-84
7 d. Master Painters Institute MPI # 44, 44 X-Green™, 144, 144 X-Green™
- 8 C. Material Compatibility:
9 1. Materials for use within each paint system shall be compatible with one another and substrates
10 indicated, under conditions of service and application as demonstrated by manufacturer, based on
11 testing and field experience.
12 2. For each coat in a paint system, products shall be recommended in writing by topcoat
13 manufacturers for use in paint system and on substrate indicated.
- 14 D. Repainting of Existing Surfaces:
15 1. Basis of Design: No Rinse Prepaint Cleaner as manufactured by Sherwin Williams.
16 a. CERCLAReportable Quantity: N/A.
17 b. RCRAHazardous Waste No.: N/A.
18 2. Concentrated, alkaline detergent blend specially developed to reduce cleaning time by eliminating
19 the rinsing step.
20 3. Cleaner shall be biodegradable, non-flammable, non-carcinogenic, and contain no butyl, silicone,
21 petroleum or chlorinated solvents.
22 4. Cleaner shall be accepted with an A-1 category designation as a general cleaning agent on all
23 surfaces or for use with steam or mechanical cleaning devices in all departments of USDA
24 inspected facilities.

25 **2.3 SCHEDULE OF PAINT COLORS AND SHEENS**

- 26 A. PT-1:
27 1. System: Acrylic latex.
28 2. Basis of Design: Benjamin Moore & Co. "Ultra Spec".
29 3. Sheen: Flat.
- 30 B. PT-2:
31 1. System: Acrylic latex.
32 2. Basis of Design: Benjamin Moore & Co. "Ultra Spec".
33 3. Sheen: Eggshell.
- 34 C. PT-3:
35 1. System: Two-component polyurethane-fortified coating and cross-linker.
36 2. Basis of Design: "Scuffmaster ScrubTough - Max," Master Coating Technologies.
37 3. Sheen: As manufactured.
38 4. Performance:
39 a. VOC: Coatings shall have less than 50 g/l of VOC's.
40 b. Fire Rating: Coatings shall be Type I or Class A fire-rated, ASTM E 84.
41 c. Scrub Test: Greater than 8000 cycles, ASTM D 2486.
42 d. Impact Resistance: Greater than 60 in/lbs, ASTM D 2794.
43 e. Chemical Resistance: 10 (test maximum) for all chemicals tested, ASTM D 1308.
44 f. Stain Removal: 8 to 10 (test maximum) for all stains tested, four-hour Open Spot Test.
45

- 1 D. PT-4:
- 2 1. System: High solids, three-component, aliphatic, moisture-cure urethane.
- 3 2. Basis of Design: Tennant Eco-HTS 100 Satin Urethane Topcoat.
- 4 3. Sheen: Semi-gloss.
- 5 4. VOC: <5 g/l (0.04 lbs./gal.).
- 6 5. COF (ASTM D2047): 0.63
- 7 6. Thickness (WFT): 3.2 mils/coat.
- 8 7. Application: Over resinous flooring specified in Section 09 67 23 – Resinous Flooring.
- 9 8. Color 4A: Black.
- 10 9. Color 4B: Yellow.
- 11 E. PT-5:
- 12 1. System: Acrylic latex with Titanium Dioxide & Corrosion Inhibitors. Master Painters Institute MPI
- 13 #153, 163.
- 14 2. Basis of Design: Super Spec HP D.T.M. Acrylic Semi-Gloss P29.
- 15 3. VOC: 206 Grams/Liter, 1.72 Lbs./Gallon.
- 16 4. Sheen: Semi-Gloss (40-60 @ 60°).
- 17 F. PT-6: Refer to Section 09 91 13 – Exterior Painting for system, BOD and sheen.
- 18 G. PT-7:
- 19 1. System: Blacken coating for mild steel - fast drying transparent lacquer.
- 20 2. Basis of Design: Permalac NT Blackened as manufactured by Peacock Laboratories
- 21 3. Color: Transparent Black.
- 22 H. PT-A
- 23 1. Name: Paint Color A.
- 24 2. Basis of Design: BM 2121-70 – Chantilly Lace.
- 25 I. PT-B
- 26 1. Name: Paint Color B.
- 27 2. Basis of Design: BM 1617 – Cheating Heart.

28 **2.4 SOURCE QUALITY CONTROL**

- 29 A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
- 30 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor
- 31 will be notified in advance and may be present when samples are taken. If paint materials have
- 32 already been delivered to Project site, samples may be taken at Project site. Samples will be
- 33 identified, sealed, and certified by testing agency.
- 34 2. Testing agency will perform tests for compliance with product requirements.
- 35 3. Owner may direct Contractor to stop applying paints if test results show materials being used do
- 36 not comply with product requirements. Contractor shall remove noncomplying paint materials from
- 37 Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be
- 38 required to remove rejected materials from previously painted surfaces if, on repainting with
- 39 complying materials, the two paints are incompatible.

40 **PART 3 - EXECUTION**

41 **3.1 EXAMINATION**

- 42 A. Examine substrates and conditions, with Applicator present, for compliance with requirements for
- 43 maximum moisture content and other conditions affecting performance of the Work.
- 44 B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
- 45 1. Concrete: 12 percent.
- 46 2. Gypsum Board: 12 percent.
- 47 3. Masonry (Clay and CMUs): 12 percent.

- 1 C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- 2 D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and
3 primers.
- 4 E. Proceed with coating application only after unsatisfactory conditions have been corrected.
5 1. Application of coating indicates acceptance of surfaces and conditions.

6 **3.2 PREPARATION - GENERAL**

- 7 A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting
8 Specification Manual" and "MPI Maintenance Repainting Manual" applicable to substrates and paint
9 systems indicated.
- 10 B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be
11 painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied
12 protection before surface preparation and painting.
13 1. After completing painting operations, use workers skilled in the trades involved to reinstall items
14 that were removed. Remove surface-applied protection if any.
- 15 C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and
16 incompatible paints and encapsulants.
17 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as
18 required to produce paint systems indicated.
- 19 D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint
20 surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's
21 written instructions.
- 22 E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or
23 alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- 24 F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods
25 recommended in writing by paint manufacturer.
- 26 G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is
27 abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1
28 for touching up shop-primed surfaces.
- 29 H. Cotton or Canvas Insulation Covering Substrates:
30 1. Paint exposed to view covering
31 2. Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

32 **3.3 EXISTING SURFACES PREPARATION**

- 33 A. Refer to Drawings for existing surfaces to be painted.
- 34 B. Prior to repainting of existing surfaces the following surface preparation shall be provided.
35 1. Remove loose debris from the surface by spray flushing, wiping, pre-wetting and air lancing or
36 vacuuming.
37 2. Select proper dilution rate of no-rinse product specified per substrate material and condition.
38 3. Apply with a pressure washer, conventional or airless sprayer, hand pump sprayer, hose-end
39 sprayer or manually with a brush, cloth, sponge or fiber pad.
40 4. To prevent streaking on vertical surfaces, apply solution from the bottom working upward for the
41 initial wetting of the surface.
42 5. Before applying a coating or sealant, compare the pH of the surface to the coating or sealant
43 manufacturer's specifications.

1 **3.4 APPLICATION**

- 2 A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
3 1. Use applicators and techniques suited for paint and substrate indicated.
4 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before
5 final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat
6 only.
7 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items
8 to match exposed surfaces.
9 4. Do not paint over labels of independent testing agencies or equipment name, identification,
10 performance rating, or nomenclature plates.
11 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory
12 finished if acceptable to topcoat manufacturers.
- 13 B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a
14 uniform paint finish, color, and appearance.
- 15 C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller
16 tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- 17 D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and
18 Security Work:
19 1. Paint the following work where exposed in occupied spaces as noted on Finish Plans:
20 a. Equipment.
21 b. Uninsulated metal piping.
22 c. Pipe hangers and supports.
23 d. Metal conduit.
24 e. Plastic conduit.
25 f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other
26 paintable jacket material.
27 2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are
28 visible from occupied spaces.

29 **3.5 FIELD QUALITY CONTROL**

- 30 A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency
31 to inspect and test paint for dry film thickness.
32 1. Contractor shall touch up and restore painted surfaces damaged by testing.
33 2. If test results show that dry film thickness of applied paint does not comply with paint
34 manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats
35 as needed to provide dry film thickness that complies with paint manufacturer's written
36 recommendations.

37 **3.6 CLEANING AND PROTECTION**

- 38 A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project
39 site.
- 40 B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing,
41 scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- 42 C. Protect work of other trades against damage from paint application. Correct damage to work of other
43 trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an
44 undamaged condition.
- 45 D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted
46 surfaces.
47

1 **3.7 INTERIOR PAINTING SCHEDULE**

2 A. Refer to Drawings for existing elements and surfaces to be painted.

3 B. CONCRETE - (Walls, Poured Concrete). **NONE.**

4 C. CONCRETE: (Ceilings). **NONE.**

5 D. CONCRETE - (Floors, non-vehicular):

6 1. High solids, three-component, aliphatic, moisture-cure urethane system:

7 a. Semi-Gloss System: **(PT-4)**

8 1) Two coats at specified WFT.

9 E. MASONRY: CMU - Concrete.

10 1. Latex Systems:

11 a. Eggshell / Satin Finish:

12 1) 1st Coat: Benjamin Moore Super Spec® Masonry Interior/Exterior Hi-Build Block
13 Filler 206 (45 g/L), MPI # 4, X-Green 4, , LEED V4, CHPS Certified.

14 2) 2nd Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell N538 (0 g/L), MPI # 52, X-
15 Green 52, 145, X-Green 145, 139, X-Green 139, , LEED V4, CHPS Certified.

16 3) 3rd Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell N538 (0 g/L), MPI # 52, X-
17 Green 52, 145, X-Green 145, 139, X-Green 139, , LEED V4, CHPS Certified.

18 F. METAL: Aluminum, Galvanized, pipe.

19 1. Latex Systems:

20 a. Flat Finish:

21 1) 1st Coat: Benjamin Moore Super Spec® HP Acrylic Metal Primer P04 (47 g/L), MPI #
22 107, X-Green 107, 134, , CHPS Certified.

23 2) 2nd Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53,
24 X-Green 53, 143, X-Green 143, , LEED V4, CHPS Certified.

25 3) 3rd Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53,
26 X-Green 53, 143, X-Green 143, , LEED V4, CHPS Certified.

27 G. METAL: Galvanized; Duct work.

28 1. Dryfall Waterborne Topcoats:

29 a. Flat Finish:

30 1) 1st Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.

31 2) 2nd Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.

32 H. METAL - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous and Ornamental Iron,
33 Structural Iron, Ferrous Metal)

34 1. Dryfall Waterborne Topcoats:

35 a. Flat Finish:

36 1) 1st Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.

37 2) 2nd Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.

38 3) 3rd Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.

39 b. Semi-Gloss High Performance: **(PT-5)**

40 1) Prep: Remove loose rust and scale with a scraper, wire brush, or sandpaper.
41 Remove oils from bare metal with Benjamin Moore® Oil & Grease Emulsifier (P83).

42 2) 1st Coat: Super Spec HP® D.T.M. Acrylic Semi-Gloss P29.

43 3) 2nd Coat: Super Spec HP® D.T.M. Acrylic Semi-Gloss P29.

44

- 1 I. METAL - (Vendor Stall Canopy)
- 2 1. Transparent lacquer finish: **(PT-7)**
- 3 a. Flat Finish:
- 4 1) 1st Coat: .3 to .5 mils DFT.
- 5 2) 2nd Coat: .3 to .5 mils DFT.
- 6 3) Successive Coat(s): To match approved mockup.
- 7 4) Apply to clean and dry surface. First coat to be thinned per manufacturer's
- 8 instructions.
- 9 5) Follow touch-up procedures after painted metal fabrication is installed.
- 10 J. WOOD - (Walls, Ceilings, Doors, Trim): **NONE.**
- 11 K. DRYWALL - (Walls, Ceilings, Gypsum Board and similar items)
- 12 1. Latex Systems:
- 13 a. Flat System: **(PT-1)**
- 14 1) 1st Coat: Benjamin Moore Ultra Spec 500 Interior Latex Primer N534 (0 g/L), MPI #
- 15 50, X-Green 50, 149, X-Green 149, , LEED V4, CHPS Certified.
- 16 2) 2nd Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53,
- 17 X-Green 53, 143, X-Green 143, , LEED V4, CHPS Certified.
- 18 3) 3rd Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53,
- 19 X-Green 53, 143, X-Green 143, , LEED V4, CHPS Certified.
- 20 b. Special System: **(PT-3)**
- 21 1) Primer: Basis of Design: "Primemaster Primer/Sealer," Master Coating Technologies.
- 22 2) Finish Coats(s): Basis of Design: "Scuffmaster ScrubTough - Max," Master Coating
- 23 Technologies.

24 **END OF SECTION**

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SECTION 09 96 53

ELASTOMERIC COATINGS

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [ACTION SUBMITTALS](#)
- 1.4 [MAINTENANCE MATERIAL SUBMITTALS](#)
- 1.5 [QUALITY ASSURANCE](#)
- 1.6 [DELIVERY, STORAGE, AND HANDLING](#)
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PART 2 – PRODUCTS

- 2.1 [MANUFACTURERS](#)
- 2.2 [ELASTOMERIC ARCHITECTURAL COATING AND RESTORATION \(COAT-2\)](#)

PART 3 – EXECUTION

- 3.1 [SURFACE PREPARATION](#)
- 3.2 [PRIMING](#)
- 3.3 [MIXING](#)
- 3.4 [APPLICATION](#)
- 3.5 [PROTECTION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes surface preparation and application of elastomeric coatings to the following exterior substrates:
 - 1. Concrete masonry units
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 01 91 00 "Commissioning" for submittal and product requirements.
 - 3. Section 07 24 19 "Water-Drainage Exterior Insulations and Finish System (EIFS)".

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Submit manufacturer's technical data sheets and product information for each product.
 - 2. Indicate VOC content.
- B. Sustainability Submittals:
 - 1. Submit manufacturer's LEED product information for each product.
- C. Samples for Verification: For each type of elastomeric coating indicated and in each color and gloss.
 - 1. Submit Samples on same type of substrate as that to receive application, 8 inches square.
 - 2. Apply coats on Samples in steps to show each separate coat, including primers and block fillers as applicable.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 percent but not less than 1 gal. of each material, color, and texture applied.

- 1 **1.5 QUALITY ASSURANCE**
2 A. Applicator Qualifications: Company with minimum of 5 years experience in application of specified products
3 on projects of similar size and scope, and is acceptable to product manufacturer.
4 1. Successful completion of a minimum of 5 projects of similar size and complexity to specified Work.
5 B. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify
6 preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality
7 standards for materials and execution.
8 1. Architect will select one surface to represent surfaces and conditions for application of each paint
9 system.
10 a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
11 b. Other Items: Architect will designate items or areas required.
12 2. Final approval of color selections will be based on mockups.
13 a. If preliminary color selections are not approved, apply additional mockups of additional colors
14 selected by Architect at no added cost to Owner.
15 3. Approval of mockups does not constitute approval of deviations from the Contract Documents
16 contained in mockups unless Architect specifically approves such deviations in writing.
17 4. Subject to compliance with requirements, approved mockups may become part of the completed
18 Work if undisturbed at time of Substantial Completion.

- 19 **1.6 DELIVERY, STORAGE, AND HANDLING**
20 A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
21 B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures
22 continuously maintained at not less than 45 deg F.
23 1. Maintain containers in clean condition, free of foreign materials and residue.
24 2. Remove rags and waste from storage areas daily.

- 25 **1.7 FIELD CONDITIONS**
26 A. Environmental Requirements:
27 B. Do not apply material when substrate or ambient temperature is 40 degrees F (4 degrees C) or below or is
28 expected to fall below 40 degrees F (4 degrees C) within 24 hours after application.
29 1. Do not apply material if rain is expected within 24 hours of application.
30 2. Do not apply over moving cracks, control joints, or expansion joints.
31 3. Do not apply to horizontal traffic-bearing surfaces.

- 32 **1.8 WARRANTY**
33 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace
34 elastomeric coatings that fail within specified warranty period.
35 1. Failures include, but are not limited to, the following:
36 a. Water penetration through the coating.
37 b. Deterioration of coating beyond normal weathering.
38 2. Warranty Period: 10 years from date of Substantial Completion.

39 **PART 2 - PRODUCTS**

- 40 **2.1 MANUFACTURERS**
41 A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
42 1. Dryvit
43 2. Sto Corp.
44 3. Textured Coatings of America, Inc.

- 45 **2.2 ELASTOMERIC ARCHITECTURAL COATING AND RESTORATION (COAT-2)**
46 A. Basis of Design: Dryvit Systems, Inc. Weatherlast.
47 B. Coating - General:
48 1. System: 100% acrylic, utilizing DPR (Dirt Pickup Resistant) chemistry and an elastomeric binder to
49 bridge hairline cracks.
50 2. Material Characteristics:
51 a. Surface Burning (ASTM E 84)
52 1) Flame Spread <25.
53 2) Smoke Developed <450.
54 b. Tensile Strength (ASTM D 412) 200 psi.

- 1 c. Elongation (ASTM D 412): 450% Recovery at 100 %.
- 2 d. Elongation (ASTM D 412): 90% minimum.
- 3 e. Water Vapor Transmission (ASTM E 96 Procedure B): Vapor Permeable 17.4 Perms.
- 4 f. Flexibility (ASTM D 522 Method B) Passed. 1.0 in diameter at 40 degree F.
- 5 g. Accelerated Weathering:
 - 6 1) ASTM G 154 Cycle 1 (QUV): No deleterious effects after 5000 hours.
 - 7 2) ASTM G 154 Cycle 1 (Xenon Arc): No deleterious effects after 5000 hours.
- 8 h. Chalk Rating (ASTM D 4214 after ASTM G 154 Cycle 1): Chalk rating 9+ after 5000 hours
- 9 QUV.
- 10 i. Freeze-Thaw Resistance:
 - 11 1) ASTM E 2485: No deleterious effects after 90 cycles.
- 12 j. Mildew Resistance (ASTM D 3273): No growth 28 day during exposure period.
- 13 k. Salt Spray Resistance (ASTM B 117): No deleterious effects after 1000 hours.
- 14 l. Water Resistance (ASTM D 2247): No deleterious effects after 42 days.
- 15 m. Abrasion Resistance (ASTM D 968 Method A Falling Sand): No deleterious effects after 1057
- 16 quarts (1000 liters).
- 17 C. Finish (Finish confirmed by Mock-up):
 - 18 1. Weatherlastic Quarzputz: A 100% acrylic based finish utilizing an elastomeric binder with a coarse
 - 19 aggregate producing an open textured pattern in a regular or random style.
 - 20 2. Weatherlastic Sandpebble: A 100% acrylic based finish utilizing an elastomeric binder with a
 - 21 pebble like texture.
 - 22 3. Color: White.
- 23 D. Materials:
 - 24 1. Water: Shall be clean and potable.
 - 25 2. Patching Material:
 - 26 a. The following products have been evaluated and found to be compatible with Weatherlast
 - 27 products:
 - 28 b. #5100 Plastiflex® Elastomeric Adhesive Caulk (brush grade) - Available from Scott Paint
 - 29 (www.scottpaint.com) (1-800-282-2016)
 - 30 c. #5200 Plastiflex Elastomeric Patching Compound (knife grade) - Available from Scott Paint
 - 31 (www.scottpaint.com) (1-800-282-2016)

32 **PART 3 - EXECUTION**

33 **3.1 SURFACE PREPARATION**

- 34 A. Protection: Protect adjacent Work areas and finish surfaces from damage during coating application.
- 35 B. Prepare surfaces in accordance with manufacturer's instructions.
- 36 C. Ensure that substrate is sound, clean, dry, and free of dust, dirt, oils, grease, laitance, efflorescence, mildew,
- 37 fungus, biological residues, and other contaminants that could prevent proper adhesion.

38 **3.2 PRIMING**

- 39 A. Apply primer in accordance with manufacturer's instructions.
- 40 B. Use primer approved by coating manufacturer.

41 **3.3 MIXING**

- 42 A. Mix coating in accordance with manufacturer's instructions to ensure uniform color and aggregate
- 43 disbursement and to minimize air entrapment.
- 44 B. In multi-pail applications, mix contents of each new pail into partially used pail to ensure color consistency
- 45 and smooth transitions from pail to pail.

46 **3.4 APPLICATION**

- 47 A. Apply coating in accordance with manufacturer's instructions.
- 48 B. The finish shall be brush, spray or trowel applied in accordance with specific product instructions.
- 49 C. Additives shall not be added under any circumstances.
- 50 D. The finish shall be applied to the entire wall surface in a continuous application to a natural break.
- 51 E. Finish shall be protected from airborne contamination such as dust, soot, etc. and from weather and other
- 52 damage until fully dried.

53 **3.5 PROTECTION**

- 54 A. Protect applied coating from damage during construction.

SECTION 10 11 00

VISUAL DISPLAY UNITS

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [PREINSTALLATION MEETINGS](#)
- 1.4 [ACTION SUBMITTALS](#)
- 1.5 [INFORMATIONAL SUBMITTALS](#)
- 1.6 [CLOSEOUT SUBMITTALS](#)
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- 1.8 [FIELD CONDITIONS](#)
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PART 2 – PRODUCTS

- 2.1 [PEG BOARD](#)
- 2.2 [CORK MATERIALS](#)
- 2.3 [RELATED MATERIALS](#)

PART 3 – EXECUTION

- 3.1 [EXAMINATION](#)
- 3.2 [PREPARATION](#)
- 3.3 [INSTALLATION](#)
- 3.4 [CLEANING AND PROTECTION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Visual display board assemblies (**CORK-1**).
 - 2. Metal peg Board (**PEG-1**).
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.
 - 2. Include electrical characteristics for motorized units.
- B. Sustainable Design Submittals:
 - 1. Contributes to the following LEED® credits:
 - 2. Materials & Resources:
 - a. Credit 4: Recycled Content (41.5% Pre-Consumer)
 - b. Credit 6: Rapidly Renewable Materials (87%)
 - 3. Indoor Environmental Quality:
 - a. Credit 4.3: Low-Emitting Materials (Listed on LEM Table)
 - b. Credit 4.1: Low-Emitting Materials (Adhesive complies with SCAQMD Rule #1168)
 - 4. Product Data: For installation adhesives, indicating VOC content.
 - 5. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For visual display units.
 - 1. Include plans, elevations, sections, details, and attachment to other work.
- D. Samples for Verification: For each type of visual display unit indicated.

- 1 1. Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for
2 final Work. Include one panel for each type, color, and texture required.
3 E. Product Schedule: For visual display units. Use same designations indicated on Drawings.
- 4 **1.5 INFORMATIONAL SUBMITTALS**
- 5 A. Qualification Data: For Installer.
6 B. Sample Warranties: For manufacturer's special warranties.
- 7 **1.6 CLOSEOUT SUBMITTALS**
- 8 A. Maintenance Data: For visual display units to include in maintenance manuals.
- 9 **1.7 QUALITY ASSURANCE**
- 10 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
11 manufacturer.
- 12 **1.8 FIELD CONDITIONS**
- 13 A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and
14 weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary
15 HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy
16 levels during the remainder of the construction period.
- 17 **1.9 WARRANTY**
- 18 A. Special Warranty for Cork Sheets: Manufacturer agrees to repair or replace face sheets that fail in
19 materials or workmanship within specified warranty period.
20 1. Warranty Period: 5 years from date of Substantial Completion.

21 **PART 2 - PRODUCTS**

22 **2.1 PEG BOARD**

- 23 A. Metal Peg Board (**PEG-1**).
24 1. Basis of Design: Uline Metal Pegboard.
25 2. Color: Black.
26 3. Mount: H-4294, Mounting Hardware.
27 B. Accessories: Black, H-4292. Quantity per blackboard.
28 1. PEG-1: Refer to Material ID List and Drawings:
29 a. QTY: (3) HAFPO2.BLACK
30 b. QTY: (1) HPBHOK.60
31 c. QTY: (2) HD23-107.BLACK
32 d. QTY: (2) HPB.ADAP. FOR METAL PEGBOARD
33 2. PEG-2: Refer to Material ID List and Drawings:
34 a. QTY: (6) HAFPO2.BLACK
35 b. QTY: (1) HPBHOK.60

36 **2.2 TACKBOARD PANELS**

- 37 A. Tackboard Panels (**CORK-1**):
38 1. Facing: 1/4-inch-thick, natural cork.
39 2. Core: 1/4-inch-thick hardboard.

40 **2.3 CORK MATERIALS**

- 41 A. Natural-Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face
42 sanded for natural finish.
43 1. Basis of Design Manufacturer: Forbo Flooring Systems.
44 2. Color: Black Olive.
45 3. Content: Cork, Linseed Oil, Jute.
46 4. Thickness: 6.0 mm
47 5. Roll Dimensions: 1.22 m x ≤ 28 m
48 6. Recycled Content: 43%.
49 7. Through-body color construction.
50 B. Performance:

MSR LTD
09 JUNE 2023

- 1
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1. Meets or exceeds all technical requirements as set forth in ASTM F 2034, Standard Specification for Linoleum Sheet Flooring. Type I.
 2. Class B when tested in accordance to ASTM E 84/NFPA 255, Standard Test Method for Surface Burning Characteristics.

1 **2.4 RELATED MATERIALS**

- 2 A. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as
3 defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde
4 Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
5 B. Hardboard: ANSI A135.4, tempered.
6 C. Adhesives for Field Application: Mildew-resistant, nonstaining adhesive for use with specific type of panels,
7 sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit
8 manufacturer.
9 1. Adhesive shall comply with the testing and product requirements of the California Department of
10 Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical
11 Emissions from Indoor Sources Using Environmental Chambers."

12 **PART 3 - EXECUTION**

13 **3.1 EXAMINATION**

- 14 A. Examine walls and partitions for proper preparation and backing for visual display units.
15 B. Proceed with installation only after unsatisfactory conditions have been corrected.

16 **3.2 PREPARATION**

- 17 A. Comply with manufacturer's written instructions for surface preparation.
18 B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and
19 affect the smooth, finished surfaces of visual display boards.
20 C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks,
21 defects, projections, depressions, and substances that will impair bond between visual display units and
22 wall surfaces.

23 **3.3 INSTALLATION**

- 24 A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if
25 not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds,
26 clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete
27 installation.
28 B. Field-Assembled Visual Display Board Assemblies: Coordinate field-assembled units with grounds, trim,
29 and accessories indicated. Join parts with a neat, precision fit.

30 **3.4 CLEANING AND PROTECTION**

- 31 A. Clean visual display units in accordance with manufacturer's written instructions. Attach one removable
32 cleaning instructions label to visual display unit in each room.
33 B. Touch up factory-applied finishes to restore damaged or soiled areas.
34 C. Cover and protect visual display units after installation and cleaning.

35 **END OF SECTION**

SECTION 10 14 23

ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 – GENERAL

[1.1 RELATED DOCUMENTS](#)

[1.2 SCOPE](#)

[1.3 RELATED DOCUMENTS](#)

[1.4 QUALITY ASSURANCE](#)

[1.5 SUBMITTAL](#)

[1.6 LABOR](#)

[1.7 DELIVERY, STORAGE, AND HANDLING](#)

[1.8 PROJECT CONDITIONS](#)

[1.9 SEQUENCING AND SCHEDULING](#)

[1.10 ENGINEERING](#)

PART 2 – PRODUCTS

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PART 3 – EXECUTION

[3.1 EXAMINATION](#)

[3.2 FABRICATION](#)

[3.3 INSTALLATION](#)

[3.4 ADJUSTMENT AND CLEANING](#)

[3.5 PROTECTION](#)

[3.6 SIGN REPLACEMENT MANUAL](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE

- A. Work includes materials, fabrication, and installation.
1. Furnish and install all items as specified herein, and as indicated on the drawings.
B. Coordinate work and site access with the General Contractor and the Architect.

1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions, apply to this work.

1.4 QUALITY ASSURANCE

- A. The requested work shall comply with all Federal and State codes, laws, and regulations, and all municipal ordinances or regulations in effect at the time work is being performed.
B. Any alternates or changes to sign types, materials, and construction methods specified in this document must be approved by the Architect.
C. Installer Qualifications: Engage an experienced installer who is familiar with the specified product and the installation of the specified product.
D. The manufacturer, subsidiary, or licensed agent shall be approved to supply the products specified, and to honor any claims against the product presented in accordance with the warranty.
E. For items which, when installed become fixed, provide shop drawings and details of connections, anchors, and adhesives.
F. Contractor shall guarantee that all material and work specified and furnished are guaranteed for one (1) year after punch list sign off, to be free of defects and faulty workmanship, and that any defective material or work shall be promptly repaired or replaced without additional cost to the Owner. The one-year guarantee shall include guarantee that materials, finishes, adhesives, and fasteners of all items, supplied and installed, will not peel, fade, crack, or release during the guarantee period.

1.5 SUBMITTAL

- A. Shop Drawings shall be submitted, indicating elevations of all sign types, all dimensions, letter and numerical style and sizes, schedules for all sign types, materials, colors, finishes, and all fabrication and installa-

- 1 tion details verified. Architect's approval of shop drawings is required before any work commences. All
2 work shall be executed in strict accordance with drawings.
- 3 B. Descriptive literature shall be submitted to indicate materials, finishes, installation instructions and details
4 for all sign materials.
- 5 C. Submit one sample of each exposed finish (which will be used for actual production) to the Architect for
6 verification and approval prior to fabrication. Submit full size mock-ups within thirty (30) business days of
7 award of bid for all sign types specified. All mock-ups shall become the property of the Owner and will not
8 be permitted to be installed on the job site. All samples are subject to review by the Architect and all ap-
9 proved samples shall become the standard of comparison for all installation work. The Architect will review
10 all submittals and will reject any work not meeting quality standards.
- 11 D. Maintenance Data: Provide in form suitable for inclusion in Owner's maintenance manuals. Data shall in-
12 clude purchase source listing and similar information. Recommendations for proper maintenance materials
13 and procedures shall also be included for each finish specified. Include precautions against materials and
14 methods which may be detrimental to finishes and performance.

15 **1.6 LABOR**

- 16 A. All work shall be fabricated square, plumb, straight, and true.
- 17 B. Cut-out letters, numbers, and images shall be cut in continuous, even lines as indicated on drawings.
- 18 C. Fabricator shall provide all supporting and anchoring means as required for proper installation.
- 19 D. Accessories, anchorage, mounting devices, and spacers shall be guaranteed to be non-staining to adja-
20 cent walls and sign finishes for a period of five years after acceptance.
- 21 E. Exposed joints shall be continuously welded, ground, and polished smooth and shall not be visible. Cor-
22 ners shall be snug, neat, and tight fitting in an even, smooth plane.
- 23 F. Fabricator is responsible for providing proper thickness of materials to eliminate deformations.

24 **1.7 DELIVERY, STORAGE, AND HANDLING**

- 25 A. Contractor shall deliver at the job site and install in its designated location all items specified herein by the
26 date designated in the Invitation to Bid.
- 27 B. Delivery shall be made to the job site during normal business hours: TBD. The Contractor shall provide
28 adequate facilities and labor for unloading.
- 29 C. Inspect items upon delivery for damage. Minor damages may be repaired provided finished repairs are
30 equal to the quality of new work and acceptable to the Owner and approved by the Architect.
- 31 D. Product shall be handled and stored to prevent damage.

32 **1.8 PROJECT CONDITIONS**

- 33 A. Field Measurements: Verify all conditions, sizes, locations, and quantities before order and fabrication.
- 34 B. Field Verify all color(s) of adjacent wall(s) before installation.

35 **1.9 SEQUENCING AND SCHEDULING**

- 36 A. Sequence delivery of signs to minimize possibility of damage during the remainder of the construction pe-
37 riod.

38 **1.10 ENGINEERING**

- 39 A. All structural engineering is the responsibility of the successful bidder. All specifications pertaining to mate-
40 rials and fabrications are to establish minimum material and physical appearance only.

41 **PART 2 - PRODUCTS**

42 **2.1 MATERIALS**

- 43 A. All materials used in production and installation shall be new, of top quality and free of defects.
- 44 B. Sheet plastic shall be free of wrinkles or imperfections from fabrication.
45 All surfaces shall be free of scratches and shall be clean and polished at completion of installation.
- 46 C. Colors shall meet specifications on drawings. Sample colors shall be submitted for Architect's approval.
- 47 D. All inks, paints, and stains are to be applied evenly, without scratches, peeling, uneven edges, marks, etc.
48 Workmanship in conjunction with finish and formation of letters must be acceptable to the Architect. Prime
49 coats of other surface pre-treatments, where recommended by the manufacturer for inks and paints, shall
50 be included in the work as part of the finishes surface work at no extra cost to the Owner.
- 51 E. All mounting hardware, although not expressively stated in the specification, shall be included with the bid
52 price. Furnish all mounting and anchoring hardware and devices as required to completely install all work.

- 1 All fastening devices must meet fabricator recommendations. Bidders are required to visit the site prior to
2 bidding for field understanding of mounting surfaces.
- 3 F. Font: See drawing of details for fonts. Signage contractor to be responsible for requirements of upper and
4 lower case of copy as required by ADA. Alternate letter forms must be approved by Architect. Font color
5 to match color specified by Architect except as otherwise noted herein. All letter forms must be so aligned
6 as to maintain a base line parallel to the sign format. Margins must be maintained consistent within the
7 sign types.
- 8 G. Letter size: All letter forms and work spacing shall be produced by photo mechanical methods and shall
9 be set "normal" except as directed by the Architect.
- 10 H. Grade 2 Braille: Braille to be raised 1/32" minimum from plaque first surface by Raster Method processes.
11 Braille to comply with relevant ADA regulations and the requirements indicated for size, style, spacing,
12 content, and positions Translation of sign copy is the responsibility of the fabricator.

13 **PART 3 - EXECUTION**

14 **3.1 EXAMINATION**

- 15 A. Contractor shall be responsible for inspection of project site and approval of installation conditions for this
16 work. Proceed with installation only after unsatisfactory conditions have been corrected.

17 **3.2 FABRICATION**

- 18 A. All signs and related work, including all structural supports and connections, shall be fabricated in a man-
19 ner to withstand weight load, double of actual item installed.
- 20 B. All fabrication shall be in accordance with the highest standards of the trade. All signs and components
21 shall be complete and free from visual and structural flaws.
- 22 C. All work shall be carefully fitted with minimum size joints, accurately located, and rigidly assembled. All
23 corners, joints, miters, etc. shall be accurately machined, filed, and fitted. All joints shall be hairline unless
24 otherwise indicated.
- 25 D. All paints shall be applied in strict conformance to manufacturer recommendations. All paint shall be care-
26 fully applied to avoid sags, runs, orange peel, or other unacceptable finish surface conditions. All material
27 to which paint is to be applied shall be properly de-greased, cleaned, and treated if required for the best
28 possible results.

29 **3.3 INSTALLATION**

- 30 A. Sign contractor to examine the substrates and conditions under which the installation is to be performed
31 and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not
32 proceed with the installation until unsatisfactory conditions have been corrected.
- 33 B. Install items at locations shown on drawings. Communicate any discrepancies observed in the field to Ar-
34 chitect prior to installation.
- 35 C. Install all items as shown on drawings, with all dust and dirt removed. Tape and tape marks are to be re-
36 moved from surfaces. Contractor shall remove all crating, plastic coverings, and debris from the project,
37 leaving premises in showroom condition; free from dust and ready for the Owner's use, unless otherwise
38 instructed by Architect. Replace all damaged units as directed by the Architect.
- 39 D. Precaution shall be taken to protect building from damage. Any damage to walls, floors, or carpet noticed
40 at the time of installation shall be brought to the attention of the Owner.
- 41 E. Coordinate all work with other contractors working on project and with any future contracts. Work schedule
42 and rules for contractor will be enforced. The work schedule will be established upon approval by admin-
43 istration.
- 44 F. The interior signage contractor shall obtain and pay for all required permits from authorities having jurisdic-
45 tion.

46 **3.4 ADJUSTMENT AND CLEANING**

- 47 A. Immediately upon completion of installation, clean components and surfaces. Remove surplus materials,
48 rubbish, and debris resulting from installation upon completion of work and leave areas of installation in
49 neat, clean condition.

50 **3.5 PROTECTION**

- 51 A. All surfaces and sign components shall be protected until final installation and approval by Owner or Archi-
52 tect (punch list). Any work damaged or discolored in any way before installation and approval occurs shall
53 be corrected by the fabricator without additional cost to the Owner.

- 1 B. Advise Owner of additional protection needed to ensure that items will be without damage or deterioration
2 until completion of construction.

3 **3.6 SIGN REPLACEMENT MANUAL**

- 4 A. Contractor shall provide the Owner with a sign replacement manual after completion of all signage installa-
5 tion. Manual shall contain all information required to order all sign types. Each sign type should be de-
6 scribed in such a format the Owner only need fill out the requirements for copy, after selecting sign type.
7 B. The following information should be included for each type:
8 1. Unit Price
9 2. Diagram showing copy location, dimensions, color placement, copy sizes, and installation info.

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END OF SECTION

**SECTION 10 14 53
TRAFFIC SIGNAGE**

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- PART 1 – GENERAL
- 1.1 RELATED DOCUMENTS
- 1.2 SUMMARY
- PART 2 – PRODUCTS
- 2.1 SIGN COMPONENTS
- 2.2 GENERAL FINISH REQUIREMENTS
- PART 3 – EXECUTION
- 3.1 EXAMINATION
- 3.2 INSTALLATION, GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Work of this section shall be in accordance with the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, latest edition and City of Madison Standard Specifications for Public Works Construction.

PART 2 - PRODUCTS

2.1 SIGN COMPONENTS

- A. Sign posts: Hot dipped galvanized, tubular steel sign post telescoping assembly compliant with 634.2.5.1 of the Standard Specifications, WisDOT.
- B. Sign Panels: Sheet aluminum complying with 637.2.1.3 of Standard Specifications, WisDOT, panel thickness 0.08 inch for parking signs, 0.10 inches for stop signs.
- C. Type H reflective sheeting.

2.2 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Graphics shall be precise, true and compliant with applicable standards.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site signage where required.
- B. Install site signage level, plumb, true, and securely anchored at locations by type as indicated on Drawings.

END OF SECTION

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SECTION 10 22 13

WIRE MESH PARTITIONS

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [DEFINITIONS](#)
- 1.4 [ACTION SUBMITTALS](#)
- 1.5 [MAINTENANCE MATERIAL SUBMITTALS](#)
- 1.6 [QUALITY ASSURANCE](#)
- 1.7 [DELIVERY, STORAGE, AND HANDLING](#)
- 1.8 [FIELD CONDITIONS](#)

PART 2 – PRODUCTS

- 2.1 [MANUFACTURERS](#)
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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Heavy-duty wire mesh partitions (**WIRE-1**).
 - 2. Wire mesh ceilings.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 1. Section 08 71 00 "Door Hardware" for keyed cylinders.

1.3 DEFINITIONS

- A. Intermediate Crimp: Wires pass over one and under the next adjacent wire in both directions, with wires crimped before weaving and with extra crimps between the intersections.
- B. Lock Crimp: Deep crimps at points of the intersection that lock wires securely in place.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainability Submittals:
 - 1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Indicate clearances required for operation of doors.
- D. Samples for Verification: 12-by-12-inch panel constructed of specified frame members and wire mesh. Show method of finishing members at intersections.

- 1 **1.5 MAINTENANCE MATERIAL SUBMITTALS**
2 A. Furnish extra materials that match products installed and that are packaged with protective covering for
3 storage and identified with labels describing contents.
4 1. Door Locks: Furnish 5 percent of quantity installed for each type indicated.
- 5 **1.6 QUALITY ASSURANCE**
6 A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
7 B. Welding Qualifications: Qualify procedures and personnel according to the following:
8 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
9 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
- 10 **1.7 DELIVERY, STORAGE, AND HANDLING**
11 A. Deliver wire mesh items with cardboard protectors on perimeters of panels and doors and with posts
12 wrapped to provide protection during transit and Project-site storage. Use vented plastic.
13 B. Inventory wire mesh partition door hardware on receipt, and provide secure lockup for wire mesh partition
14 door hardware delivered to Project site.
15 1. Tag each item or package separately with identification, and include basic installation instructions
16 with each item or package.
- 17 **1.8 FIELD CONDITIONS**
18 A. Field Measurements: Verify actual dimensions of construction contiguous with wire mesh units by field
19 measurements before fabrication.

20 **PART 2 - PRODUCTS**

- 21 **2.1 MANUFACTURERS**
22 A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
23 1. Acorn Wire & Iron Works.
24 2. Central Wire and Iron.
25 3. Folding Guard Corporation.
26 4. Standard Wire & Steel Works.
- 27 **2.2 PERFORMANCE REQUIREMENTS**
28 A. Structural Performance: Wire mesh units shall withstand the effects of gravity loads and the following loads
29 and stresses within limits and under conditions indicated.
30 1. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft. at any location on a panel.
31 2. Total load of 200 lbf applied uniformly over each panel.
32 3. Concentrated load and total load need not be assumed to act concurrently.
- 33 **2.3 MATERIALS**
34 A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer
35 recycled content not less than 25 percent.
36 B. Steel Wire: ASTM A 510.
37 C. Steel Plates, Channels, Angles, and Bars: ASTM A 36/A 36M.
38 D. Steel Sheet: Cold-rolled steel sheet, ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
39 E. Steel Pipe: ASTM A 53/A 53M, Schedule 40, unless another weight is indicated or required by structural
40 loads.
41 F. Steel Tubing: ASTM A 500/A 500M, cold-formed structural-steel tubing or ASTM A 513, Type 5, mandrel-
42 drawn mechanical tubing.
43 G. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with G60zinc
44 (galvanized) or A60zinc-iron-alloy (galvannealed) coating designation.
45 H. Panel-to-Panel Fasteners: Manufacturer's standard steel bolts, nuts, and washers.
46 I. Post-Installed Anchors: Capable of sustaining, without failure, a load equal to 6 times the load imposed
47 when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by
48 testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
49 1. Material for Interior Locations: Carbon-steel components are zinc plated to comply with ASTM B
50 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
51 J. Zinc-Rich Primer: Compatible with topcoat, complying with SSPC-Paint 20 or SSPC-Paint 29.

- 1 **2.4 HEAVY-DUTY WIRE MESH PARTITIONS (WIRE-1)**
- 2 A. Mesh: 0.192-inch-diameter, intermediate-crimp steel wire woven into 2-inch diamond mesh.
- 3 B. Vertical and Horizontal Panel Framing: 1-1/2-by-3/4-by-1/8-inch cold-rolled steel channels; with holes for
4 3/8-inch-diameter bolts not more than 12 inches o.c.
- 5 C. Horizontal Panel Stiffeners: Two cold-rolled steel channels, 1 by 1/2 by 1/8 inch, bolted or riveted toe to
6 toe through mesh.
- 7 D. Top Capping Bars: 3-by-1-inch steel channels.
- 8 E. Posts for 90-Degree Corners: 1-1/2-by-1-1/2-by-1/8-inch steel angles or tubes or 2-by-2-by-0.075-
9 inch cold-rolled steel angles or tubes, with holes for 3/8-inch-diameter bolts aligning with bolt holes in
10 vertical framing; with 1/4-inch steel base plates.
- 11 F. Posts for Other-Than-90-Degree Corners: 2-inch-OD by 1/8-inch steel pipe or round tube, with holes for
12 3/8-inch-diameter bolts aligning with bolt holes in vertical framing; with 1/4-inch steel base plates.
- 13 G. Adjustable Corner Posts: Two 1-1/2-by-3/4-by-1/8-inch cold-rolled, steel channels or 2-by-2-by-0.075-
14 inch steel tubes connected by steel hinges at 36 inches o.c. attached to posts; with 1/4-inch-diameter bolt
15 holes aligning with bolt holes in vertical framing; with 1/4-inch steel base plates.
- 16 H. Line Posts: 3-inch-by-4.1-lb 3-1/2-by-1-1/4-by-1/8-inch steel channels; with 1/4-inch steel base plates.
- 17 I. Three- and Four-Way Intersection Posts: 2-by-2-by-0.075-inch steel tubes, with holes for 3/8-inch-diameter
18 bolts aligned for bolting to adjacent panels; with 1/4-inch steel base plates.
- 19 J. Floor Shoes: Metal, not less than 2 inches high; sized to suit vertical framing, drilled for attachment to floor,
20 and with set screws for leveling adjustment.
- 21 K. Swinging Doors: Fabricated from same mesh as partitions, with framing fabricated from 1-1/2-by-3/4-by-
22 1/8-inch steel channels, banded with 1-1/2-by-1/8-inch flat steel bar cover plates on four sides, and with
23 1/8-inch-thick angle strike bar and cover on strike jamb.
- 24 1. Hinges: Full-surface type, 3-1/2-by-3-1/2-inch steel, three per door; bolted, riveted, or welded to
25 door and jamb framing.
- 26 2. Padlock Lug: Mortised into door framing and enclosed with steel cover.
- 27 3. Inactive Leaf Hardware: Cane bolt at bottom and chain bolt at top.
- 28 L. Sliding Doors: Fabricated from same mesh as partitions, with framing fabricated from 1-1/2-by-3/4-by-1/8-
29 inch steel channels, banded with 1-1/2-by-1/8-inch flat steel bar cover plates on four sides.
- 30 1. Hardware: Two, four-wheel roller-bearing carriers, box track, and bottom guide channel for each
31 door.
- 32 2. Padlock Lug: Mortised into door framing and enclosed with steel cover.
- 33 M. Accessories:
- 34 1. Sheet Metal Base: 0.060-inch-thick, steel sheet.
- 35 2. Adjustable Filler Panels: 0.060-inch-thick steel sheet, capable of filling openings from 2 to 12
36 inches.
- 37 3. Wall Clips: Manufacturer's standard, cold-rolled steel sheet; allowing up to 1 inch of adjustment.
- 38 N. Finish: Powder-coated finish unless otherwise indicated.
- 39 1. Color: Match Architect's samples.
- 40 **2.5 WIRE MESH CEILINGS**
- 41 A. Mesh, Framing, and Stiffeners: Fabricated from same mesh and framing as wire mesh partition panels.
- 42 B. Perimeter Partition Supports: Steel angle, with holes for 1/4-inch-diameter bolts aligned for bolting to top of
43 wire mesh partitions and to sides of wire mesh ceiling panels.
- 44 C. Wall Supports: Steel angle punched for attachment to wall and wire mesh ceiling panels.
- 45 D. Intermediate Supports: Steel I-beams or rectangular tubes, as recommended by manufacturer.
- 46 E. Finishes: Match adjacent wire mesh partitions.
- 47 **2.6 FABRICATION**
- 48 A. General: Fabricate wire mesh items from components of sizes not less than those indicated. Use larger-
49 sized components as recommended by wire mesh item manufacturer. Furnish bolts, hardware, and
50 accessories required for complete installation with manufacturer's standard finishes.
- 51 1. Fabricate wire mesh items to be readily disassembled.
- 52 2. Welding: Weld corner joints of framing and grind smooth, leaving no evidence of joint.
- 53 B. Heavy-Duty Wire Mesh Partitions: Fabricate wire mesh partitions with cutouts for pipes, ducts, beams, and
54 other items indicated. Finish edges of cutouts to provide a neat, protective edge.
- 55 1. Mesh: Securely clinch mesh to framing.
- 56 2. Framing: Fabricate framing with mortise and tenon corner construction.
- 57 a. Provide horizontal stiffeners as indicated or, if not indicated, as required by panel height and
58 as recommended by wire mesh partition manufacturer. Weld horizontal stiffeners to vertical
59 framing.

- 1 b. Fabricate three- and four-way intersections using intersection posts and manufacturer's
- 2 standard connecting clips and fasteners.
- 3 c. Fabricate partition and door framing with slotted holes for connecting adjacent panels.
- 4 3. Fabricate wire mesh partitions with 3 to 4 inches of clear space between finished floor and bottom
- 5 horizontal framing.
- 6 4. Doors: Align bottom of door with bottom of adjacent panels.
- 7 a. For doors that do not extend full height of partition, provide transom over door, fabricated
- 8 from same mesh and framing as partition panels.
- 9 5. Hardware Preparation: Mortise, reinforce, drill, and tap doors and framing as required to install
- 10 hardware.
- 11 C. Latch and Lock Hardware:
- 12 1. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in
- 13 Section 08 71 00 "Door Hardware."
- 14 D. Wire Mesh Ceilings: Fabricate wire mesh partitions with cutouts for pipes, ducts, beams, and other items
- 15 indicated. Finish edges of cutouts to provide a neat, protective edge.
- 16 1. Mesh: Securely clinch mesh to framing.
- 17 2. Framing: Fabricate framing with mortise and tenon corner construction.
- 18 a. Provide stiffeners as indicated or, if not indicated, as required by panel span and as
- 19 recommended by wire mesh ceiling manufacturer. Weld stiffeners to framing.

20 2.7 STEEL AND IRON FINISHES

- 21 A. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-on
- 22 powder-coat finish, suitable for use indicated, with a minimum dry film thickness of 2 mils.
- 23 1. Color and Gloss: Match Architect's sample.

24 PART 3 - EXECUTION

25 3.1 EXAMINATION

- 26 A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and
- 27 other conditions affecting performance of the Work.
- 28 B. Examine floors for suitable conditions where wire mesh items will be installed.
- 29 C. Examine walls to which wire mesh items will be attached for properly located blocking, grounds, and other
- 30 solid backing for attachment of support fasteners.
- 31 D. Proceed with installation only after unsatisfactory conditions have been corrected.

32 3.2 WIRE MESH PARTITIONS ERECTION

- 33 A. Anchor wire mesh partitions to floor with 3/8-inch-diameter post installed expansion anchors at 12 inches
- 34 o.c. through floor shoes located at each post and corner. Adjust wire mesh partition posts in floor shoes to
- 35 achieve level and plumb installation.
- 36 B. Anchor wire mesh partitions to walls at 12 inches o.c. through back corner panel framing and as follows:
- 37 1. For hollow masonry anchorage, use toggle bolts.
- 38 C. Secure top capping bars to top framing channels with 1/4-inch-diameter "U" bolts spaced not more than 28
- 39 inches o.c.
- 40 D. Provide line posts at locations indicated or, if not indicated, as follows:
- 41 1. On each side of sliding-door openings.
- 42 2. For partitions that are 7 to 9 feet high, spaced at 15 to 20 feet o.c.
- 43 3. For partitions that are 10 to 12 feet high, located between every other panel.
- 44 4. For partitions that are more than 12 feet high, located between each panel.
- 45 E. Where standard-width wire mesh partition panels do not fill entire length of run, provide adjustable filler
- 46 panels to fill openings.
- 47 F. Install doors complete with door hardware.
- 48 G. Weld or bolt sheet metal bases to wire mesh partitions, doors, and where indicated.
- 49 H. Bolt accessories to wire mesh partition framing.

50 3.3 WIRE MESH CEILINGS ERECTION

- 51 A. Anchor wall support angle to walls at 12 inches o.c. and as follows:
- 52 1. For hollow masonry anchorage, use toggle bolts.
- 53 B. Attach wire mesh ceiling panels to wall support angles with bolts at 12 inches o.c.
- 54 C. Attach wire mesh ceiling panels to wire mesh partitions with slotted angles bolted to sides of ceiling panels
- 55 and to top of partitions at 12 inches o.c.

- 1 D. Attach wire mesh ceiling panels to intermediate supports as recommended by manufacturer.
- 2 **3.4 ADJUSTING AND CLEANING**
- 3 A. Adjust doors to operate smoothly and easily, without binding or warping. Adjust hardware to function
- 4 smoothly. Confirm that latches and locks engage accurately and securely without forcing or binding.
- 5 B. Remove and replace defective work, including doors and framing that are warped, bowed, or otherwise
- 6 unacceptable.
- 7 C. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas.
- 8 Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-
- 9 PA 1 for touching up shop-painted surfaces.

10 **END OF SECTION**

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SECTION 10 26 00

WALL AND DOOR PROTECTION

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PART 2 – PRODUCTS

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PART 3 – EXECUTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Wall and corner protection.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 05 50 00 "Metal Fabrications" for pipe guards and wheel guards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For each type of wall and floor protection showing locations and extent.
 - 1. Include plans, elevations, sections, and attachment details.
- C. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
 - 1. Wall and Floor Guards: 12 inches long. Include examples of joinery, corners, end caps, top caps, and field splices.
- D. Sample Warranty: For special warranty.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with applicable provisions in [the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities] [and] [ICC A117.1] <Insert requirement>.

2.3 WALL GUARDS (GUARD-1)

- A. Basis of Design: Model 2182 as manufactured by Wallguard.com.
- B. Stainless Steel Crash Rail:
 1. Surface mounted stainless steel crash rail system consisting of a continuous 1-1/2 inches x 5-1/2 inches stainless steel rail with V-Groove accent, mounting brackets, and end caps. Rail is factory cut and formed from 16 gauge stainless steel to field dimensions. End caps shall be cut from 1/8 inch stainless steel with mounting holes and hardware for mechanical attachment to rail.
 2. Rail: Type 304, 16 Ga, stainless steel sheet.
 3. Mounting Brackets: Type 304, 16 Ga, stainless steel sheet.
 4. End Caps: Type 304, 1/8 inch stainless sheet.
 5. Finish: #4 satin finish.

2.4 FLOOR MOUNTED CRASH RAIL (GUARD-2)

- A. Basis of Design: CB bumper system as manufactured by Alvarado Mfg. Co., Inc.
- B. Components:
 1. CB Rail: 11-gauge steel, chrome-plated or hot-dip galvanized finish.
 2. Spring Post: 7-gauge spring steel, powder-coated.
 3. End Caps: Cast aluminum.
 4. Length: Individual sections can be joined to create longer runs as required by the application. Include 135 degree CB (CB-135) where indicated or required. Refer to Drawings.

2.5 CORNER GUARDS (GUARD-3)

- A. Basis of Design: Koffler Sales Company; Stainless Steel Corner Guard, A674.
 1. Type 304, 16 gauge stainless steel.
 2. Stainless Steel No.4.
 3. Brushed vertical finish.
 4. Profile, Height and Size: Refer to Drawings.
 5. Application: Undrilled for adhesive installation.
 6. Height: Full height.

2.6 CORNER GUARDS (GUARD-4)

- A. Basis of Design: Alpar
- B. Style: Flush Mount Biobased Polymer End Wall MODEL: CG-888B.
- C. Color: 301 Linen White.

2.7 WALL PROTECTION PANEL (PNL-1#)

- A. Basis of Design: WB-40 as manufactured by Alpar Architectural Products, LLC
 1. Size: As indicated.
 2. Sheet Thickness: 0.040 inch (1.0 mm).
 3. Color **PNL-1A**: 301 Linen White.
 4. Color **PNL-1B**: 210 Silver Gray.
 5. Height: As indicated.
 6. Mounting: Adhesive.

- B. Impact-Resistant Sheet Wall Covering: Fabricated from Biobased, PVC-free Polymer sheet plastic sheet wall-covering material.
 - 1. Biobased Plastic: Class 1, textured, chemical- and stain-resistant, high-impact-resistant Modified Polylactide Resin with flame retardant; integral color throughout.
 - 2. Green Seal Certification to GS-36.
 - 1. Flame-Spread Index (Ceiling): 0.
 - 2. Smoke-Developed Index: 15 or less.
 - 3. Biobased Content: Minimum 90 % when tested to ASTM 6466.
 - 4. Chemical and stain resistance per ASTM D543.
 - 5. EPA approved biodegradable.

2.8 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.9 FINISHES

- A. 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 walls to which wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and floor protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Adjust end and top caps as required to ensure tight seams.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

END OF SECTION

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SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

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PART 2 – PRODUCTS

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PART 3 – EXECUTION

[3.1 INSTALLATION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Private-use bathroom accessories.
4. Warm-air dryers.
5. Childcare accessories.
6. Underlavatory guards
7. Kitchenette accessories.
8. Custodial accessories.

- B. Related Requirements:

1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
B. Samples: Full size, for each exposed product and for each finish specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
1. Warranty Period: 15 years from date of Substantial Completion.

1 **PART 2 - PRODUCTS**

2 **2.1 PERFORMANCE REQUIREMENTS**

3 A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a
4 qualified testing agency, and marked for intended location and application.

5 **2.2 PUBLIC-USE WASHROOM ACCESSORIES**

6 A. Refer to Material ID List

7 **2.3 PUBLIC-USE SHOWER ROOM ACCESSORIES**

8 A. Refer to Material ID List

9 **2.4 WARM-AIR DRYERS**

10 A. Refer to Material ID List

11 **2.5 CHILDCARE ACCESSORIES**

12 A. Refer to Material ID List

13 **2.6 UNDERLAVATORY GUARDS**

14 A. Refer to Material ID List

15 B. Underlavatory Guard:

- 16 1. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct
17 contact with and burns from piping; allow service access without removing coverings.
18 2. Material and Finish: Antimicrobial, molded plastic, white.

19 **2.7 CUSTODIAL ACCESSORIES**

20 A. Refer to Material ID List

21 **2.8 FABRICATION**

22 A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide
23 minimum of [six] <Insert number> keys to Owner's representative.

24 **PART 3 - EXECUTION**

25 **3.1 INSTALLATION**

26 A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to
27 substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored
28 in locations and at heights indicated.

29 B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

30 **END OF SECTION**

SECTION 10 44 13

FIRE EXTINGUISHER CABINETS

PART 1 – GENERAL

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PART 2 – PRODUCTS

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[2.2 FIRE PROTECTION CABINET \(FEC-1\)](#)

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PART 3 – EXECUTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Fire protection cabinets (**FEC-#**).
- B. Related Sections:
1. Division 10 Section "Fire Extinguishers."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.5 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

1 **PART 2 - PRODUCTS**

2 **2.1 MATERIALS**

- 3 A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
4 B. Stainless-Steel Sheet: ASTM A 666, Type 304.

5 **2.2 FIRE PROTECTION CABINET (FEC-#).**

- 6 A. Cabinet: Cold rolled steel with an electrostatically applied, thermally-fused polyester coating with
7 recoatable white finish, and a continuous hinge. Door and Frame: Model 7050-7069: Stainless Steel -
8 #304 Stainless steel with #4 finish. Provide where walls are of insufficient depth for recessed cabinets but
9 are of sufficient depth to accommodate semi-recessed cabinet installation.
10 1. Provide fire rated box where scheduled in fire rated walls.
11 2. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.
12 3. Cabinet Trim Material: Same material and finish as door.
13 4. Door Style: F-FP Flush Solid Metal & Flush Pull Handle. Identify fire extinguisher in security fire
14 protection cabinet with the words "FIRE EXTINGUISHER."
15 5. Lettering: Vertical white.
16 B. Cabinet Type: Suitable for fire extinguisher.
17 1. Basis of Design:
18 a. Manufacturer: Potter Roemer.
19 b. Product: Surface applied (FEC-1) and Recessed (FEC-2) Alta Fire Extinguisher Cabinets
20 (Recessed and semi-recessed).
21 C. Accessories
22 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to security
23 fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with
24 plated or baked-enamel finish.

25 **2.3 FABRICATION**

- 26 A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware
27 to suit cabinet type, trim style, and door style indicated.
28 1. Weld joints and grind smooth.
29 2. Provide factory-drilled mounting holes.
30 3. Prepare doors and frames to receive locks.
31 4. Install door locks at factory.
32 B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and
33 coordinated with cabinet types and trim styles selected.
34 1. Fabricate door frames of one-piece construction with edges flanged.
35 2. Miter and weld perimeter door frames.

36 **2.4 GENERAL FINISH REQUIREMENTS**

- 37 A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations
38 for applying and designating finishes.
39 B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a
40 strippable, temporary protective covering before shipping.
41 C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in
42 appearance of adjoining components are acceptable if they are within the range of approved Samples and
43 are assembled or installed to minimize contrast.

44 **2.5 FINISHES**

- 45 A. Stainless-Steel: Facing sheets and closures fabricated from ASTM A 666, Type 302 or 304, stainless-
46 steel sheet.
47 1. Finish: No. 4 bright, directional polish on exposed faces. Exposed surfaces are protected from
48 damage by application of strippable, temporary protective covering before shipment.

49 **PART 3 - EXECUTION**

50 **3.1 EXAMINATION**

- 1 A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be
2 installed.
3 B. Proceed with installation only after unsatisfactory conditions have been corrected.

4 **3.2 PREPARATION**

- 5 A. Prepare recesses for semirecessed fire protection cabinets as required by type and size of cabinet and
6 trim style.

7 **3.3 INSTALLATION**

- 8 A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated,
9 at heights acceptable to authorities having jurisdiction.
10 1. Fire Protection Cabinets: 54 inches above finished floor to top of cabinet.
11 B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
12 1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not
13 adequate for recessed cabinets, provide semirecessed fire protection cabinets.
14 2. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.

15 **3.4 ADJUSTING AND CLEANING**

- 16 A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed
17 unless otherwise indicated in manufacturer's written installation instructions.
18 B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices
19 operate properly.
20 C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended
21 by manufacturer.
22 D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished
23 appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and
24 mounting bracket manufacturers.
25 E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair
26 by finish touchup or similar minor repair procedures.

27 **END OF SECTION**

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SECTION 10 44 16

FIRE EXTINGUISHERS

1
2
3 PART 1 – GENERAL
4 1.1 RELATED DOCUMENTS
5 1.2 SUMMARY
6 1.3 SUBMITTALS
7 1.4 QUALITY ASSURANCE
8 1.5 COORDINATION
9 1.6 WARRANTY
10 PART 2 – PRODUCTS
11 2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS
12 2.2 MOUNTING BRACKETS
13 PART 3 – EXECUTION
14 3.1 EXAMINATION
15 3.2 INSTALLATION

16 PART 1 - GENERAL

17 1.1 RELATED DOCUMENTS

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

20 1.2 SUMMARY

21 A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

22 B. Related Requirements:

23 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

24 1.3 SUBMITTALS

25 A. Product Data: For each type of product indicated. Include rating and classification, material descriptions,
26 dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

27 B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection
28 cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

29 C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

30 D. Warranty: Sample of special warranty.

31 1.4 QUALITY ASSURANCE

32 A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire
33 Extinguishers."

34 B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency
35 acceptable to authorities having jurisdiction.

36 1. Provide fire extinguishers approved, listed, and labeled by FMG.

37 1.5 COORDINATION

38 A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

39 1.6 WARRANTY

40 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire
41 extinguishers that fail in materials or workmanship within specified warranty period.

42 1. Failures include, but are not limited to, the following:

43 a. Failure of hydrostatic test according to NFPA 10.

44 b. Faulty operation of valves or release levers.

45 2. Warranty Period: Six years from date of Substantial Completion.

46

1 **PART 2 - PRODUCTS**

2 **2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS**

- 3 A. Fire Extinguishers: Type, size, and capacity for each mounting bracket indicated.
- 4 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
5 that may be incorporated into the Work include, but are not limited to the following:
- 6 a. Amerex Corporation.
- 7 b. Ansul Incorporated; Tyco International.
- 8 c. JL Industries, Inc.; a division of the Activar Construction Products Group.
- 9 d. Kidde Residential and Commercial Division.
- 10 2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar
11 coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- 12 B. Multipurpose Dry-Chemical Type: ABC Model 3010. UL Rating 4A-10BC nominal capacity, with
13 monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.
- 14 C. Purple-K Dry-Chemical Type in Brass Container (kitcen): UL-rated 80-B:C, 10-lb (4.5-kg) nominal capacity,
15 with potassium bicarbonate-based dry chemical in chrome-plated-brass container.

16 **2.2 MOUNTING BRACKETS**

- 17 A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall
18 or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black
19 baked-enamel finish.
- 20 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 21 a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
- 22 b. Larsen's Manufacturing Company.
- 23 B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and
24 location. Locate as indicated by Architect.
- 25 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter
26 decals applied to mounting surface.
- 27 a. Orientation: Vertical.

28 **PART 3 - EXECUTION**

29 **3.1 EXAMINATION**

- 30 A. Examine fire extinguishers for proper charging and tagging.
- 31 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- 32 B. Proceed with installation only after unsatisfactory conditions have been corrected.

33 **3.2 INSTALLATION**

- 34 A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with
35 requirements of authorities having jurisdiction.
- 36 1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.
- 37 B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

38 **END OF SECTION**

SECTION 10 55 00.13

USPS-DELIVERY POSTAL SPECIALTIES

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [ACTION SUBMITTALS](#)
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- 1.5 [CLOSEOUT SUBMITTALS](#)
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PART 2 – PRODUCTS

- 2.1 [MAIL RECEPTACLES](#)
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PART 3 – EXECUTION

- 3.1 [EXAMINATION](#)
- 3.2 [INSTALLATION](#)
- 3.3 [FIELD QUALITY CONTROL](#)
- 3.4 [ADJUSTING AND CLEANING](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Mail receptacles.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 08 71 00 "Door Hardware" for lock cylinders for postal specialties that are keyed to building keying system and for letter slots in doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of postal specialty.
- B. Shop Drawings: For postal specialties.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include identification sequence for compartments.
 - 3. Include layout of identification text.
 - 4. Include setting drawings, templates, and installation instructions for anchor bolts and other anchorages installed as part of the Work of other Sections.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of postal specialty required to comply with USPS regulations, signed by product manufacturer. Include written approval by Postmaster General.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For postal specialties and finishes to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Furnish lock keys according to USPS requirements; with temporary identification for their respective locks, bagged, and securely taped inside the collection compartment for shipping.

1 **1.7 WARRANTY**

- 2 A. Special Warranty: Manufacturer agrees to repair or replace components of postal specialties that fail in
3 materials or workmanship within specified warranty period.
4 1. Failures include, but are not limited to, the following:
5 a. Structural failures.
6 b. Faulty operation of hardware.
7 c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
8 2. Warranty Period: Five years from date of Substantial Completion.

9 **PART 2 - PRODUCTS**

10 **2.1 MAIL RECEPTACLES**

- 11 A. Front-Loading Mail Receptacles (**MAIL-1**): Consisting of multiple compartments with fixed, solid
12 compartment backs, enclosed within a recessed wall box. Provide access to compartments for distributing
13 incoming mail from front of unit by unlocking master lock and swinging side-hinged master door to provide
14 accessibility to entire group of compartments. Provide access to each compartment for removing mail by
15 swinging compartment door. Comply with USPS-STD-4C.
16 1. Basis-of-Design Product: Subject to compliance with requirements, provide Versatile 4C14D-16-SM
17 as manufactured by Florence Corporation or comparable product by one of the following:
18 a. Jensen Mailboxes; Architectural Building Products Division of Steel Craft Corporation.
19 b. National Mailboxes; NMHP, Inc.
20 c. Postal Products Unlimited, Inc.
21 d. W. A. Charnstrom Company.
22 2. Front-Loading Master Door: Fabricated from extruded aluminum and braced and framed to hold
23 compartment doors; prepared to receive master-door lock.
24 a. Master-Door Lock: Door prepared to receive lock provided by local postmaster.
25 3. Compartments: As indicated on Drawings.
26 4. Compartment Doors: Fabricated from extruded aluminum. Equip each with lock and tenant
27 identification as required by USPS-STD-4C. Provide mail slot in the compartment with master-door
28 lock.
29 a. Compartment-Door Locks: Comply with USPS-L-1172C for locks and keys, or equivalent as
30 approved by the USPS; with three keys for each compartment door. Key each compartment
31 differently.
32 b. Parcel-Locker-Compartment-Door Locks: Two-key security system in which control key
33 provides access to parcel-locker-compartment key, which opens compartment and is
34 retained once opened.
35 5. Frames: Fabricated from extruded aluminum or aluminum sheet; ganged and nested units, with
36 cardholder and blank cards for tenant's identification within each compartment.
37 6. Concealed Components and Mounting Frames: Aluminum or steel sheet with manufacturer's
38 standard finish.
39 7. Exposed Aluminum Finish: Finish surfaces exposed to view as follows:
40 a. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from
41 manufacturer's full range.
42 B. Two Parcel Locker:
43 1. Basis-of-Design Product: Subject to compliance with requirements, provide Versatile 4C14S-2P-
44 SM as manufactured by Florence Corporation or comparable product by one of the following:
45 a. Jensen Mailboxes; Architectural Building Products Division of Steel Craft Corporation.
46 b. National Mailboxes; NMHP, Inc.
47 c. Postal Products Unlimited, Inc.
48 d. W. A. Charnstrom Company.

49 **2.2 FABRICATION**

- 50 A. Form postal specialties to required shapes and sizes, with true lines and angles, square, rigid, and without
51 warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges and corners free
52 of sharp edges and burrs and safe to touch. Fabricate doors of postal specialties to preclude binding,
53 warping, or misalignment.
54 B. Preassemble postal specialties in shop to greatest extent possible to minimize field assembly.

- 1 C. Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather to exclude
- 2 water penetration.
- 3 D. Drill or punch holes required for fasteners and remove burrs. Use security fasteners where fasteners are
- 4 exposed. If used, seal external rivets before finishing.
- 5 E. Weld in concealed locations to greatest extent possible without distorting or discoloring exposed surfaces.
- 6 Remove weld spatter and welding oxides from exposed surfaces.
- 7 F. Fabricate tubular and channel frame assemblies with manufacturer's standard welded or mechanical
- 8 joints. Provide subframes and reinforcement as required for a complete system to support loads.
- 9 G. Where dissimilar metals contact each other, protect against galvanic action by painting contact surfaces
- 10 with bituminous coating or by applying other permanent separation as recommended by manufacturers of
- 11 dissimilar metals.

12 **2.3 GENERAL FINISH REQUIREMENTS**

- 13 A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-
- 14 06)" for recommendations for applying and designating finishes.
- 15 B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary
- 16 protective covering before shipping.
- 17 C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in
- 18 appearance of adjoining components are acceptable if they are within the range of approved Samples and
- 19 are assembled or installed to minimize contrast.

20 **PART 3 - EXECUTION**

21 **3.1 EXAMINATION**

- 22 A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for
- 23 roughing-in openings, clearances, and other conditions affecting performance of the Work.
- 24 B. Examine walls and other adjacent construction for suitable conditions before installation.
- 25 C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- 26 D. Proceed with installation only after unsatisfactory conditions have been corrected.

27 **3.2 INSTALLATION**

- 28 A. Install postal specialties level and plumb, according to manufacturer's written instructions.
- 29 1. Where dissimilar metals contact each other, protect against galvanic action by painting contact
- 30 surfaces with bituminous coating or by applying other permanent separation as recommended by
- 31 manufacturer.
- 32 2. Where aluminum contacts grout, concrete, masonry, or wood, protect against corrosion by painting
- 33 contact surfaces with bituminous coating.
- 34 3. Final acceptance of postal specialties served by the USPS depends on compliance with USPS
- 35 requirements.
- 36 B. Mail Receptacles: Install mail receptacles with center of tenant-door lock cylinders and bottom of
- 37 compartments at the maximum and minimum heights above finished floor established by the USPS and
- 38 manufacturer's written instructions.
- 39 1. Install removable-core and keyed-in door lock cylinders as required for each type of cylinder lock.

40 **3.3 FIELD QUALITY CONTROL**

- 41 A. Arrange for USPS personnel to examine and test postal specialties served by the USPS after they have
- 42 been installed according to USPS regulations.
- 43

- 1 **3.4 ADJUSTING AND CLEANING**
2 A. Remove temporary protective coverings and strippable films, if any, as postal specialties are installed
3 unless otherwise indicated in manufacturer's written installation instructions.
4 B. Adjust doors, hardware, and moving parts to function smoothly, and lubricate as recommended by
5 manufacturer. Verify that integral locking devices operate properly.
6 C. Touch up marred finishes or replace postal specialties that cannot be restored to factory-finished
7 appearance. Use only materials and procedures recommended or furnished by postal-specialty
8 manufacturer.
9 D. Replace postal specialties that have been damaged or have deteriorated beyond successful repair by
10 finish touchup or similar minor repair procedures.
11 E. On completion of postal-specialty installation, clean interior and exterior surfaces as recommended by
12 manufacturer.

13 **END OF SECTION**

SECTION 10 82 00

GRILLES AND SCREENS

PART 1 – GENERAL

- [1.1 RELATED DOCUMENTS](#)
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- [1.3 ACTION SUBMITTALS](#)
- [1.4 DELIVERY, STORAGE, AND HANDLING](#)
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PART 2 – PRODUCTS

- [2.1 MANUFACTURERS](#)
- [2.2 FIXED EXTRUDED-ALUMINUM LOUVERS](#)
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- [2.4 ALUMINUM FINISHES](#)

PART 3 – EXECUTION

- [3.1 EXAMINATION](#)
- [3.2 INSTALLATION](#)
- [3.3 ADJUSTING AND CLEANING](#)

GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fixed extruded-aluminum louver blade for mechanical screen.
- B. Related Requirements:
 - 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.
 - 2. Section 05 12 23 "Structural Steel" for vertical support and rails for louver screen.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
- C. Shop Drawings: For louver and accessories. Include plans, elevations, sections, details, and attachments to other work.
- D. Samples: For each type of metal finish required.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
- B. Storage: Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finishes during handling and installation to prevent damage
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.5 WARRANTY

- A. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. 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 Model: 1625XPI as manufactured by Industrial Louvers Inc. (ILI) or comparable product by one of the following:
 1. Americlad.
 2. Ruskin Company.
- B. Source Limitations: Obtain fixed louver blades from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 FIXED EXTRUDED-ALUMINUM LOUVER SCREENS (SCRN-1)

- A. Blades:
 1. Style: Horizontal
 2. Material: Extruded aluminum, 6061/6063-T6.
 3. Wall Thickness: 0.081 inch (2.1 mm), nominal.
 4. Blades: 1.625 inches deep.
 5. Angle: 40 degrees.
 6. Centers: 4 inches (102 mm), nominal.
- B. Vertical Supports and Attachment: 5 inches deep aluminum I profile 0.125 inch thick.
- C. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- D. Regional Materials: Manufacture products within 500 miles (800 km) of Project site.

2.3 FABRICATION

- A. Fabrication Requirements:
 1. Performance: Fabricate as required for optimum performance with respect to strength, durability, and appearance.
 2. Size: Fabricate equipment screens to meet dimensions indicated on Contract Documents.
 3. Field Measurement: Verify size, location, and placement of equipment screens before fabrication.
 4. Shop Assembly:
 - a. Fabricate to minimize field adjustments, splicing, mechanical joints and field assembly of units.
 - b. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling.
 - c. Clearly mark units for reassemble and coordinated installation.
 5. Accessories: Include supports, anchorages and accessories required for complete assembly.
 6. Vertical Mullions: Provide vertical mullions of type and spacing indicated but not further apart than recommended by the manufacturer.
 7. Connections: Join frame and blade members to one another by mechanical fastener.
 8. Spacing: Maintain equal blade spacing to produce uniform appearance.

2.4 ALUMINUM FINISHES

- A. Fluorocarbon Two Coat Coating:
 - 1. Coating shall conform to AAMA 2605.
 - 2. Louvers to be finished with a minimum 1.0 mil (0.025 mm) thick full strength 70% resin, 2 coat Fluoropolymer system.
 - 3. All aluminum shall be thoroughly cleaned, etched, and given a chromatic conversion pretreatment before application of coating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, 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. Install equipment screens at locations as indicated on the drawings and in accordance with the manufacturer's instructions.
- B. Install equipment screens plumb, level and in alignment with adjacent work.

3.3 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

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SECTION 11 13 19

STATIONARY LOADING DOCK EQUIPMENT

PART 1 – GENERAL

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[1.2 SUMMARY](#)

[1.3 PREINSTALLATION MEETINGS](#)

[1.4 DEFINITIONS](#)

[1.5 SUBMITTALS](#)

PART 2 – PRODUCTS

[2.1 PERFORMANCE REQUIREMENTS](#)

[2.2 RECESSED SCISSOR LIFT \(LIFT-1\)](#)

PART 3 – EXECUTION

[3.1 EXAMINATION](#)

[3.2 PREPARATION](#)

[3.3 INSTALLATION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Recessed SCISSOR LIFT provided and installed by Owner (**LIFT-1**).
 2. Owner to provide lift manufacturer's "bumper post" to be installed by Contractor (**BOLL-1**)
 3. Light-communication systems.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory work specified elsewhere.

1.4 DEFINITIONS

- A. Operating Range: Maximum amount of travel above and below the loading dock level.
- B. Working Range: Recommended amount of travel above and below the loading dock level for which loading and unloading operations can take place.

1.5 SUBMITTALS

- A. Product and Shop Drawing information provided by Owner to Contractor for rough-in and pit construction.
- B. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for stationary loading dock equipment.
 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- C. Shop Drawings: For stationary loading dock equipment.
1. Include plans, elevations, sections, details, and attachments to other work.
 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of anchors and field connection.
- D. Light-Communication Systems:
1. Product Data.
 2. Shop Drawings.
 3. Include diagrams for power, signal, and control wiring.

1 **PART 2 - PRODUCTS**

2 **2.1 PERFORMANCE REQUIREMENTS**

3 A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a
4 qualified testing agency, and marked for intended location and application.

5 **2.2 RECESSED SCISSOR LIFT (LIFT-1)**

6 A. General: Recessed, hinged-lip-type dock levelers designed for permanent installation in concrete pits
7 preformed in the edge of loading platform; of type, function, operation, capacity, size, and construction
8 indicated; and complete with controls, safety devices, and accessories required.

9 B. Platform:

- 10 1. Platform Size: As indicated on Drawings.
11 2. Frame: Clean-pit type, designed to support leveler at sides of pit, with no supports at front of pit
12 floor.
13 3. Owner to provide lift manufacturer's "bumper post" (**BOLL-1**) to be installed by Contractor

14 **PART 3 - EXECUTION**

15 **3.1 EXAMINATION**

- 16 A. Examine areas and conditions, with Installer present, for compliance with requirements for installation
17 tolerances and other conditions affecting performance of the Work.
18 B. Examine roughing-in for electrical systems for loading dock equipment to verify actual locations of
19 connections before equipment installation.
20 C. Examine walls and floors of pits for suitable conditions where recessed loading dock equipment is to be
21 installed. Pits shall be plumb and square and properly sloped for drainage from back to front of loading
22 dock.
23 D. Proceed with installation only after unsatisfactory conditions have been corrected.

24 **3.2 PREPARATION**

- 25 A. Coordinate size and location of loading dock equipment indicated to be attached to or recessed into
26 concrete or masonry, and furnish anchoring devices with templates, diagrams, and instructions for their
27 installation.
28 B. Clean recessed pits of debris.

29 **3.3 INSTALLATION**

- 30 A. General: Install loading dock equipment as required for a complete installation.
31 1. Rough-in electrical connections.

32 **END OF SECTION**

SECTION 11 40 00
FOOD SERVICE EQUIPMENT

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PART 1 – GENERAL

- 1.1 RELATED DOCUMENTS
- 1.2 ABBREVIATIONS
- 1.3 RELATED WORK BY OTHER
- 1.4 QUALITY ASSURANCE
- 1.5 APPLICABLE CODES AND STANDARDS
- 1.6 SUBMITTALS

PART 2 – PRODUCTS

- 2.1 GENERAL
- 2.2 FABRICATION OF METALWORK
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- 2.4 REFRIGERATION REQUIREMENTS

PART 3 – EXECUTION

- 3.1 SUPERVISION
- 3.2 ASSEMBLY AND SETTING IN PLACE
- 3.3 CLEANING
- 3.4 ADJUSTMENT, TESTING AND TRAINING
- 3.5 OPERATION AND MAINTANENCE MANUALS
- 3.6 GUARANTEE

PART 4 – ITEM SPECIFICATIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. This section constitutes a separate prime contract.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 ABBREVIATIONS

ADA	Americans with Disabilities Act
AGA	American Gas Association
ASME	American Society of Mechanical Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
CFSP	Certified Food Service Professional
CM	Construction Manager
EC	Electrical Contractor
FEC	Food Service Equipment Contractor
HACCP	Hazard Analysis and Critical Control Point
HVAC	Heating, Ventilating and Air Conditioning Contractor
ID	Inside Diameter
MC	Mechanical Contractor
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
OD	Outside Diameter
OSHA	Occupational Safety & Health Administration
PC	Plumbing Contractor
UL	Underwriters Laboratories

1 1.3 RELATED WORK BY OTHERS
2

3 A. Construction Manager (CM) / General Contractor (GC)
4

- 5 1. Where applicable, provide transit level recesses for walk-in cooler/ freezer floors and other
6 depressions. Provide finished flooring material and base inside and outside of walk-in
7 coolers and freezers. Refer to Food Service Plans for details.
8
9 2. Where applicable, Provide concrete pads or floors for walk-in cooler(s)/ freezer(s) and/ or
10 compressor(s) to be installed outside.
11
12 3. Where applicable, Furnish and install all flashing necessary to tie in walk-in cooler(s)/
13 freezer(s) to building.
14
15 4. Where applicable, Install floor trough(s) and drip pan(s) when furnished by FEC. Refer to
16 Food Service Plans for details.
17
18 5. Where applicable, Furnish and install all necessary wall backing of size, type and locations
19 as indicated on Food Service Plans.
20
21 6. Where applicable, Furnish and install necessary concrete pad(s) or roof curb(s) and
22 associated penetrations for refrigeration equipment.
23

24 B. Plumbing Contractor (PC)
25

- 26 1. Provide rough-in and final connections of all services per local code requirements.
27
28 2. Flush all lines of foreign debris before connecting fixtures.
29
30 3. Provide all water supply lines, drain lines, drain fittings, floor drains, shut-off valves, traps
31 and tailpieces.
32
33 4. Provide all reduced pressure devices, pressure reducing valves and backflow prevention
34 devices except where included with equipment or furnished by FEC as part of item specs.
35 Also refer to Food Service Equipment Schedule.
36
37 5. Provide all grease traps; coordinate water usage data with FEC. Note local codes may
38 require grease (trap) interceptor for pot/ utensil wash sinks, dishmachines or drains for
39 other grease producing food service equipment. Flush inset or exterior grease traps are
40 recommended for all food service applications.
41
42 6. Install all faucets, pre rinse spray units, hose reel units, lever drains, vacuum breakers,
43 check valves, flow control valves, water inlets, traps, filters, strainers, PRV valves, T/P
44 gauges as furnished by FEC.
45
46 7. Make connections between sections of modular equipment such as range batteries, utility
47 distribution systems, chef's tables, and exhaust hoods.
48
49 8. Provide condensate line piping for walk in cooler and freezer units. Note walk-in cooler
50 condensate lines shall not pass through walk-in freezer compartments. Condensate line
51 piping shall be trapped outside the cold room and installed per prevailing codes. PC shall
52 use 1" copper tubing for condensate lines.
53
54 9. Provide sleeves for refrigerant piping and condensate piping wherever it passes through the
55 walk in cooler or freezer wall, floor or ceiling. Pack sleeve with fiberglass and perma-gum

- 1 after installation. Sleeves through floor shall project min. 3" above the finished floor.
2 Sleeves through the walls shall be flush with walls.
3
4 10. Provide all conduit for beverage lines per local code requirements.
5
6 C. Electrical Contractor
7
8 1. Provide rough-in and final connections of all services per local code requirements.
9
10 2. Provide all outlets, receptacles, conduit, contactors, controllers, disconnects, switches,
11 starters, etc., unless furnished as standard with the equipment or specifically included with
12 the equipment in the itemized specifications.
13
14 3. Install electrical devices furnished with food service equipment. FEC must indicate such
15 devices on electrical rough-in plans.
16
17 4. Make electrical connections between sections of modular equipment such as utility
18 distribution systems; exhaust hoods, refrigeration systems, walk-in cooler and freezer units
19 or chef's tables.
20
21 5. Where required by local codes, furnish and install shunt trips and/ or contactors with 120
22 Volt coils with contact ratings matching the electrical cooking appliance. EC to wire from the
23 micro switch relay on the fire control system head to the shunt trips/ contactors.
24
25 6. Walk-in cooler and freezer refrigeration systems:
26
27 a. Wire from cooler and freezer compressor time clocks to respective evaporator coils.
28 Note unless otherwise specified, time clocks shall be furnished for cooler and freezer
29 units.
30
31 b. Wire to door assembly junction box, light(s), heated air vents, condensate drain line
32 heaters (walk in freezer heat tape shall be applied under insulation) and audio/ visual
33 alarms.
34
35 c. Mount and connect all light fixtures furnished with walk in cooler(s)/ freezer(s).
36
37 7. Wet areas such as sinks, disposers, or dishwashers shall be wired with Sealtite Type EF
38 conduit or equal, through water proof boxes.
39
40 D. Mechanical Contractor (MC)
41
42 1. Provide rough-in and final connections of all mechanical services.
43
44 2. Provide fans, ducts, dampers, starters, roof curbs, roof penetrations and sealing of
45 penetrations, etc., necessary for operation of grease extracting hoods and condensate
46 hoods.
47
48 3. Provide looped gas supply lines, gas pressure reducing and regulating valves for pressure
49 above 14" W.C.
50
51 4. FEC to provide gas fire/ fuel shut-off solenoid valve(s) as part of hood fire suppression
52 system to MC for installation.
53
54 5. Install all gas valves, gas hoses and gas pressure regulators furnished by FEC and
55 indicated on Food Service Equipment Schedule.
56

57 1.4 QUALITY ASSURANCE

- 1
2 A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has
3 specialized in installing food service equipment, who has completed installations similar in
4 design and extent to that indicated for this Project, and who has a record of successful in-service
5 performance.
6
7 B. FEC shall comply with all federal, state and local laws and regulations governing health, safety,
8 fire, mechanical and electrical requirements within the applicable jurisdiction.
9
10 C. When the Construction Documents call for higher standards or larger sizes than the regulations,
11 the Construction Documents shall govern. When the regulations require higher standards or
12 larger sizes than the Construction Documents, the regulations shall govern. Rulings and
13 interpretations of the enforcing agencies shall be considered part of the regulations. No
14 additional amounts shall be paid for compliance.
15
16 D. When the requirements of the drawings exceed the written specifications, the drawings shall
17 govern and vice versa.
18
19 E. If because of jurisdictional trade agreements or other conditions, any work specified in the
20 Construction Documents must be completed by others, sublet such work only to those who are
21 qualified to do such work or make other arrangements at the expense of the FEC, subject to
22 approval by the Architect.
23

24 1.5 APPLICABLE CODES & STANDARDS

- 25
26 A. Except as otherwise indicated, each item of equipment shall comply with the latest current
27 edition of the following standards as applicable to the manufacturer, fabrication, and installation
28 of the work in this section. Comply with all Federal, State and Municipal regulations and
29 notifications, which bear on the execution of this work. Call to the attention of the Owner in
30 writing any design conflict with the requirements of the Americans with Disabilities Act (ADA)
31 during the Bid Process so resolution can be effected prior to the Contract Award.
32
33 1. NSF Standards: Comply with applicable National Sanitation Foundation Standards and
34 criteria and provide NSF "Seal of Approval" on each manufactured item and on major items
35 of custom-fabricated work.
36
37 2. UL/ ETL/ CSA Standards: For electrical components and assemblies, provide either UL/
38 ETL/ CSA listed products or, where no listing service is available, provide a complete index
39 of the components used as selected from the UL/ ETL/ CSA "Recognized Component
40 Index". For fire extinguishing systems comply with UL 300.
41
42 3. ANSI Standards: Comply with applicable ANSI standards for electrical-powered and gas-
43 burning equipment; for piping to compressed-gas cylinders; and for plumbing fitting,
44 including vacuum breaker and air gaps, to prevent siphonage in water piping.
45
46 4. AGA/ CGA: All gas fired equipment shall be AGA/ CGA approved, equipped to operate on
47 type of gas available at the job site, and shall contain 100% automatic safety shut-off
48 devices.
49
50 5. NFPA Standards: Comply with NFPA Bulletin 96 for exhaust systems; with NFPA Bulletins
51 13, 17, 17A and 96 for fire extinguishing systems; and with NFPA 54, National Fuel Gas
52 Code and NFPA 70, National Electric Code.
53
54 6. ASME Code: Comply with ASME boiler code requirements for steam-generating and
55 steam-heated equipment; provide ASME inspection, stamps, and certification of registration
56 with National Board.

- 1
2 7. SMACNA Guidelines: Where applicable provide seismic restraints for food service
3 equipment to comply with the Sheet Metal and Air Conditioning Contractors National
4 Association's (SMACNA) "Kitchen Equipment Fabrication Guidelines", appendix 1,
5 "Guidelines for Seismic Restraints of Kitchen Equipment", unless otherwise indicated.
6
7 8. ASHRAE: Provide mechanical refrigeration systems complying with the American Society of
8 Heating, Refrigeration and Air Conditioning Engineers ASHRAE 15, "Safety Code for
9 Mechanical Refrigeration".
10

11 **1.6 SUBMITTALS**

- 12
13 A. Submit food service equipment plan, rough-in plans, shop drawings and specification brochure
14 booklet within 30 days of award of contract or as required by Architect. Submit one set photo
15 copy print and one electronic PDF set to Food Service Consultant for review and approval.
16 Corrected electronic documents will be returned to FEC for revision if necessary.
17
18 B. When drawings are approved, FEC shall submit assembled sets of plans as required by
19 Architect.
20
21 C. When specification brochure booklets are approved submit assembled copies in quantity
22 required by Architect. Each page is to be numbered and sequenced corresponding to the
23 itemized specifications. Brochures are to include accessories and components used with each
24 item.
25
26 D. Provide fully dimensioned rough-in plans at $\frac{1}{4}'' = 1'-0''$ scale showing all required services
27 including; electrical, plumbing, mechanical and any related special conditions.
28
29 1. Plans are to indicate location, elevation, sized and type of water supplies, drains, gas lines,
30 floor drains, site drains, electrical supplies, outlets, switches, ducts locations, exhaust and
31 supply CFM and static pressure, etc. Include on each page a legend of commonly used
32 symbols and abbreviations.
33
34 2. Special conditions shall include, but not be limited to, curbs, bases, recesses, sleeves,
35 refrigeration lines, concealed wall backing, pass through openings, trenches, etc.
36
37 3. FEC may not use rough-in plans prepared by the Food Service Consultant for submittal with
38 the required Construction Documents without permission from the Food Service Consultant.
39 When such plans are re-used for Construction Documents it shall be the responsibility of
40 FEC to verify all dimensions as well as electrical, plumbing and mechanical rough-ins and
41 prevailing codes as they relate to the project.
42
43 E. Submit shop drawings showing plans, elevations and details for all fabricated items drawn at
44 minimum $\frac{3}{4}''$ scale.
45
46 F. After all drawings and buy out brochures have been approved and received by Owner &
47 Architect, fabrication may begin. Approvals shall not relive FEC of the responsibility for
48 conformance with the construction documents unless written approval is obtained from the
49 Owner & Architect. Also, approvals shall not relieve FEC from conformance to state and local
50 health code requirements.
51

52 **PART 2 – PRODUCTS**

53
54 **2.1 GENERAL**
55

1 A. Except as may be specified otherwise under individual item specification in "Equipment List" or
2 "Equipment Schedule", all items of standard manufactured equipment furnished shall be
3 complete in accordance with manufacturer's standard specifications for specific unit or model
4 called for, including finishes, components, attachments, appurtenances, etc.

5
6 B. Qualified Custom Stainless Fabricators include:

7
8 1. Institutional Equipment Inc.

9 704 Veterans Parkway, Unit B

10 Bolingbrook, IL 60440

11 (630) 771-0990 ph.

12 2. Nationwide Fabrication Inc.

13 10923 Leroy Dr

14 Northglenn, CO 80233

15 (303) 853-0107 ph.

16 3. Advance Tabco

17 200 Heartland Blvd.

18 Edgewood, NY 11717

19 (800) 645-3166 ph.

20 4. ACS Fabrication LLC

21 200 W. Plato Blvd.

22 St. Paul, MN 55107

23 (651) 265-0603 ph.

24

25 2.2 FABRICATION OF METALWORK

26

27 A. Sanitation Standards

28

- 29 1. All equipment shall be produced in accordance with the National Sanitation Foundation
30 (NSF) Standard 2 and bear the NSF seal.

31

32 B. Materials & Workmanship

33

- 34 1. All material shall be new, of prime quality and without flaws. The completed products shall be
35 delivered to the owner in an undamaged condition.

36

- 37 2. Stainless Steel shall conform to American Society for Testing and Materials (ASTM)
38 specification, Type 304, hardest workable temper, polished to a #4 satin finish on exterior
39 and rolled finish on interior. Working surfaces, including welds, shall be smooth, free of
40 warps, buckles, cracks, pits and scratches.

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- 3. Steel other than stainless steel, where specified to body enclosures shall be prime grade, with steel sheet bonderized and zinc coated.
- 4. Grain shall run in the same direction on all horizontal and all vertical surfaces; where table or sink tops join at right angles, terminate the finish in a mitered edge; polish grain consistent in direction throughout the length of the backsplash and sink compartment.
- 5. Sound Deadening - underside of all stainless steel top for tables, counters, sinks, dish tables with angle or channel framework shall be coated with 1/8" thick water proof mastic material, non-asphalt base and NSF approved.
- 6. Reinforce metal at locations of hardware, anchorages and accessory attachments; wherever metal is less than 14 gauge or requires mortised application. Conceal reinforcements to the greatest extent possible. Weld in place on concealed faces.
- 7. Welding and Soldering
 - a. Materials 18 gauge or heavier shall be welded.
 - b. Seams and joints shall be welded and soldered in field unless otherwise indicated in item specifications.
 - c. Welds must be ground smooth and polished to match original finish.
 - d. Where galvanizing has been burned off, the weld shall be cleaned and touched up with high-grade aluminum paint.
- 8. Provide removable panels for access to mechanical and electrical service connections, which are concealed behind or within food service equipment, but only where access is not possible.
- 9. Provide closures where ends of fixtures, back splashes, shelves, etc. are open. Fill by forming the metal or welding sections if necessary to close off entire opening flush to walls or adjoining fixtures.
- 10. Reinforce work surfaces 30 inches on center (vertical and horizontal), with galvanizing or stainless steel concealed structural members. Reinforce members which are not self-reinforced, by formed edges.
- 11. Metal tops shall be one-piece welded construction, including field joints. Secure to a full perimeter channel frame and fasten top with stud bolts or tack welds.
- 12. Field Joints - for any field joints required because of size of fixture; butt joint, reinforce on underside with angles of same material, bolt together with non-corrosive bolts and nuts, field weld, grind and polish.

C. Metal and Gauges

- 1. Fabricate the following components in stainless steel from the gauge of metal as indicated:
 - a. Table and counter tops 14 gauge
 - b. Sinks and drainboards 14 gauge
 - c. Shelves 16 gauge
 - d. Front drawer and door panels 18 gauge (double pan type)
 - e. Single pan doors and drawer fronts 16 gauge
 - f. Enclosed base cabinets 18 gauge
 - g. Enclosed wall cabinets 18 gauge

1	h. Exhaust Hoods and Ventilators	18 gauge
2	i. Pan-type inserts and trays	16 gauge
3	j. Removable covers and panels	18 gauge
4	k. Skirts and enclosure panels	18 gauge
5	l. Closure and trim strips over 4" wide	18 gauge
6	m. Hardware reinforcement	12 gauge
7	n. Gusset plates	10 gauge

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D. Pipe Bases

1. Construct pipe bases of 1 5/8" diameter, 16 gauge stainless steel tubing. Fit legs with polished stainless steel adjustable bullet feet to provide adjustment of approximately 1-1/2", without exposed threads.
2. Space legs to provide ample support for tops, precluding any possibility of bucking or sagging and in no case more than 6'-0" centers.

E. Legs and Crossrails

1. Legs and crossrails shall be 1 5/8" diameter stainless steel tubing. All intersections of rails and legs shall be welded and finished smooth. Bolts, screws or tack welds shall not be acceptable.
2. Leg sockets shall be 2" outside diameter (OD) stainless steel with set screw to secure the leg to the socket. They shall be welded to 14 gauge transverse top support channels.

F. Shelves

1. Construct solid shelves under pipe base tables of 16 gauge stainless steel, with 1 1/2" turned down and under edges on exposed sides, and 2" turn up against walls or equipment. Fully weld to legs.
2. In fixtures with enclosed bases, turn up shelves on back and sides with 1/4" minimum radius and feather slightly to ensure a tight fit to enclosure panels.

G. Sinks and Drainboards

1. All sinks and drainboards shall be constructed of 14 gauge stainless steel, unless otherwise specified, with all joints welded, ground and polished so no evidence of welding appears.
2. All vertical and horizontal corners shall be rounded to a 3/4" radius with intersections meeting in spherical sections. Multiple compartment sinks shall be divided with double wall partitions having fully rounded corners. All corners of drainboards shall be rounded on inside to 3/4" radius. All back and end splashes shall be rounded on inside to 3/4" radius. Front corners of rolled rim shall be fully rounded on outside roll and be concentric with inside of roll.
3. Front face of multiple sinks shall be one continuous piece with no overlapping joints or open spaces between compartments.
4. Drainboards shall be pitched 1/8" x 12" toward sink compartments. Sinks and drainboards shall have 10" high back splashes and end splashes where appropriate. Back splashes shall be level and continuous and not follow pitch of drainboards.
5. Bottom of each compartment shall pitch to drain and be fitted with a cast brass 2" lever operated waste outlet, provided with a stainless steel strainer plate. Set lever waste into stamped recess in sink bottom to facilitate drainage.

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6. All sinks shall be 14" deep unless otherwise specified on drawings or in item specifications.

H. Sinks set into Work Table or Work Counter

- 1. Sinks shall be constructed of 14 gauge stainless steel, unless otherwise specified, with all joints welded, ground and polished so no evidence of welding appears.
- 2. Bottom of sink compartment shall have vertical and horizontal corners rounded to 3/4" radius and pitch to drain with size and type as indicated on plan and item specifications.

I. Dishtables

- 1. Top reinforcement and support shall consist of 14 gauge stainless steel transverse leg support channels and 14 gauge stainless steel longitudinal reinforcing channel. Also refer to 2.2 Section B for reinforcement detail.
- 2. Where tables enter dishmachines or pot washing machines provide turn down into machine as recommended by manufacturer and a flange at both the front and back splash forming a water tight joint across bottom on up both sides to top edge of dishtable.
- 3. Provide sound deadening as directed in 2.2 Section B for underside of dishtables.
- 4. Follow construction details as directed in 2.2 Section G.

J. Work Tables

- 1. Top reinforcement and support shall consist of 14 gauge galvanized transverse leg support channels and 14 gauge galvanized longitudinal reinforcing channel. Also refer to 2.2 Section B for reinforcement detail.
- 2. Where stainless steel tops are specified furnish 14 gauge polished stainless steel, finished in a #4 satin finish with all exposed edges rounded with no burrs. Tops shall be turned down 1 1/2" and under 1/2" in channel shape on all exposed sides unless otherwise specified.
- 3. Where tables are located at building walls, they shall have minimum 6" high by 1" returned at 90 degrees to wall and turned down 1" at 90 degrees with all exposed ends closed ground and polished smooth. Provide heavy-duty "Z" clips for securing to building walls.
- 4. Provide sound deadening as directed in 2.2 Section B for underside of worktables.

K. Wood Table Tops

- 1. Where wood table tops are specified, top shall be 1 3/4" thick, sectional, hard rock, kiln dried maple construction. Top shall have 5" by 1" thick covered maple riser on back and ends unless otherwise indicated on plan or item specifications. Top shall be fully NSF approved.
- 2. Top shall be mounted on 14 gauge channels as indicated in 2.2 Section J.

L. Cabinet Base Construction

- 1. All cabinet type bases shall be of 16 gauge stainless steel, single wall, pan type, one piece welded construction with no visible joints or screw attachments showing. Entire unit to be braced with 14 gauge channels as indicated in 2.2 Section J.

M. Hinged Doors

- 1 1. Hinged doors for cabinet base counters shall be constructed of 18 gauge stainless steel front
2 with 20 gauge stainless steel pan shaped backs, with all corners welded, ground and
3 polished.
- 4 2. Unless otherwise specified all pull handles shall be Component Hardware, recessed door
5 pull, full grip type, Model No. P63-1012 or approved equal.
- 6
- 7 3. All doors to be furnished with chrome plated heavy duty type cylinder lock by Component
8 Hardware or approved equal.
- 9
- 10 4. All doors shall be provided with NSF approved stainless steel heavy duty lift off type hinges
11 and Cabinet Catch, Friction Type with spring action nylon rollers by Component Hardware,
12 Model No. M21-2580 or approved equal.
- 13

14 N. Drawer Assemblies

- 15
- 16 1. Drawer assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly
17 with fully enclosed housing.
- 18
- 19 2. Slide assembly shall consist of one pair of 200 pound stainless steel roller bearing extension slides,
20 with side and back enclosure panels, front spacer angle, two drawer carrier angles, secured to slides
21 and stainless front.
- 22
- 23 3. Drawer bodies for general storage shall be 20" x 20" x 5" deep with 18 gauge stainless steel or Royalite
24 containers.
- 25

26 O. Over Shelves and Wall Shelves

- 27
- 28 1. Shelves shall be constructed of 16 gauge stainless steel with working sides turned down 1
29 ½" and ½" under in channel shape with resulting corners welded, ground and polished.
- 30
- 31 2. Back of Wall Shelves shall be turned up 1 ½" and coved. When 1 ½" turn up is specified at
32 Back & Ends, Front edge of End splash shall be rounded and finished smooth.
- 33
- 34 3. Slant rack shelves used for dish racks shall have rolled front edge and 6" turn up at rear.
- 35
- 36 4. Brackets shall be 14 gauge stainless steel and be spaced to support shelf with its intended
37 contents.
- 38

39 P. Wall Cabinets

- 40
- 41 1. Wall cabinets shall be of length and depth as shown on plans or indicated in item
42 specifications. Cabinets to be 28" high, unless otherwise specified with sloped, dust proof
43 tops. Exterior bottoms shall be of flush type construction.
- 44
- 45 2. Cabinet shall be constructed of 18 gauge stainless steel, all welded construction. Cabinet
46 interiors shall be fabricated with fixed bottom and intermediate shelf unless otherwise
47 specified.
- 48
- 49 3. Where specified doors shall be double wall construction with chrome plated pulls.
- 50

51 2.3 FABRICATION OF MILLWORK & CASE WORK

- 52
- 53 A. Counter Body shall be constructed of ¾" birch or fir. Particleboard may not be substituted for
54 plywood panels. All plywood to be glued with water resistant resin glue.
- 55
- 56 B. Plastic laminate finish of interior shall be standard grade laminate white in color unless
57 otherwise specified. All interior surfaces including underside of top shall be standard grade
58 laminate finished. Exterior plastic laminate finish shall be standard grade laminate as specified

- 1 by architect or owner. All exterior surfaces shall be plastic laminate finished including those
2 units that may have backs or ends against the wall. Plastic laminate to be applied with minimum
3 quantity seams based on use of largest sheet size available from manufacturer.
4
- 5 C. Where large openings are required in counter body, such as for floor drains or beverage tubing,
6 fabricator shall provide stainless steel trim covers to conceal exposed plywood edge of counter
7 base.
8
- 9 D. Where seam is exposed provide with 1 ½" wide x ½" thick plastic laminate trim strip. Trim shall
10 be of height of counter base. Additional strips shall be provided so as to allow symmetrical
11 appearance on counter front even if not required to cover seam.
12
- 13 E. Doors shall be constructed of birch, fir or particle board with plastic laminate finish on all
14 surfaces. Provide chrome-faced locks all keyed alike. Provide Blum Mfg. concealed door
15 hinges unless otherwise specified. Where specified provide slotted doors to allow for equipment
16 ventilation. Each door shall have seven routed slots in door face ½" wide and painted to match
17 laminate color front. Provide chrome wire pulls unless otherwise specified.
18
- 19 F. Where specified in lieu of toe base, furnish 6" high NSF approved stainless steel legs with
20 adjustable bullet feet. Spacing shall be maximum 48" on center. Provide stainless steel
21 backing plates in counter base.
22
- 23 G. Where specified with stainless steel legs and adjustable feet, furnish toe base which shall be
24 removable ¾" thick birch or fir. Finish all surfaces with plastic laminate including front, back and
25 all edges. Provide in maximum lengths to accommodate all counters. End returns on exposed
26 counter sides shall be attached to front toe kick section to allow for one piece removal.
27

28 **2.4 REFRIGERATION REQUIREMENTS**
29

- 30 A. Refrigeration systems shall be installed by a knowledgeable, skilled and licensed refrigeration
31 contractor, who shall perform the work according to ASHARE standards and the conditions of
32 the contract documents. System shall be installed, charged, started, tested and fully operational.
33
- 34 B. Condensing units shall be securely mounted with adequate clearance for service. Condensing
35 units located outside the building shall be installed on a curb or pad provided by the CM/ GC
36 with refrigeration lines extending through a roof pitch pocket or wall sleeve provided by the CM/
37 GC. All refrigeration lines in the pitch pocket or sleeve to be sealed by the CM/ GC. Coordinate
38 size of curb or pad with CM/ GC.
39
- 40 C. All systems shall be designed for thermostatic expansion valves and pressure switches shall
41 operate on specified refrigerant.
42
- 43 D. Refrigeration lines shall conform to ASHARE or National Board of Fire Underwriters standards,
44 whichever is greater. Piping shall be type "L" copper, cut with a tube cutter and sized. Use
45 braising rod of no less than 15% silver. Fittings shall be wrought copper.
46
- 47 E. Piping shall be fitted with hangers at no more than 10 foot intervals horizontally and 6 foot
48 intervals vertically. Provide an oil trap at the base of vertical risers in suction lines.
49
- 50 F. Insulate walk-in cooler/ freezer suction lines and freezer condensate lines with ¾" Armaflex.
51 Walk in cooler condensate lines shall not pass through walk in freezer compartments. Walk in
52 freezer heat tape shall be applied under the insulation.
53
- 54 G. Thermometers shall be installed on the exterior of each walk in cooler/ freezer near the door.
55 Refrigeration contractor shall calibrate thermometers after three days of operation. Extend
56 sensor capillaries away from the door and secure to the walls.

- 1 F. Complete field assembly joints by welding, bolting and gasketing, or similar methods as
2 specified. Grind welds smooth and polish.
3
- 4 G. Provide closure plates and strips where required as per health code requirements.
5
- 6 H. Provide access holes and/or ferrules on equipment for piping, drains, electrical outlets, conduits,
7 etc., as required to coordinate installation of kitchen and Food Service equipment work of the
8 other contractors on project.
9
- 10 I. Provide sealants, Dow Corning 732 RTV or equal clear silicone around equipment to make joints
11 air tight, water proof, vermin proof and sanitary per health code requirements. Wipe excess out
12 of joint to fillet radius.
13
- 14 J. Repair of all damage to premises as result of this installation, and removal of all debris left by
15 those engaged in installation.
16

17 3.3 CLEANING

- 18
- 19 A. Upon completion of installation in food service areas, remove protective coverings on equipment.
20
- 21 B. Collect any warranty cards and operation & maintenance manuals attached to or inside of
22 equipment and submit to CM/ GC as described in Section III, 3.5.
23
- 24 C. Have all Food Service equipment fixtures broom cleaned and ready for operation when building
25 is turned over to owner. All sanitizing of equipment shall be completed by owner unless
26 otherwise indicated.
27

28 3.4 ADJUSTMENT, TESTING AND TRAINING

- 29
- 30 A. Test and adjust equipment, controls and safety devices to ensure proper working order and
31 conditions.
32
- 33 B. Repair or replace equipment which is found to be defective.
34
- 35 C. When cleaning, testing and adjusting have been completed, arrange for demonstration times at
36 Owner's convenience, but during normal working hours. Demonstrations shall be done by
37 competent, trained personnel, thoroughly familiar with the operation, techniques of usage,
38 capacities and maintenance of the equipment.
39

40 3.5 OPERATION AND MAINTENANCE MANUALS

- 41
- 42 A. Prior to demonstration of food service equipment the FEC shall submit three (3) set of Operation
43 and Maintenance manuals to CM/ GC or Architect for approval. Manuals shall be in hard cover
44 three ring binders and shall include replacement parts lists and a type written index sheet listing
45 name, addresses and phone numbers of all authorized service agencies for appropriate
46 equipment.
47

48 3.6 GUARANTEE

- 49
- 50 A. Equipment, parts and labor under this contract shall be guaranteed for a period of one (1)
51 calendar year from date of final invoice.
52
- 53 B. Condensing units shall be further warranted on a prorated basis for an additional four- (4) years,
54 exclusive of labor. Refrigeration warranties shall include replacement of refrigerant caused by a
55 fault or leak in the system.
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PART 4 – ITEM SPECIFICATIONS

Instructions to bidders:

1. Food Service Equipment Contractor to include cost to receive, deliver, uncrate and set in place all new food service equipment specified for final hook-ups by others.
2. Food Service Equipment Contractor shall furnish itemized bid form at specified due date.
3. Food Service Equipment Contractor shall be responsible for removal of all delivery packing material/ trash from site unless otherwise indicated by Owner & Construction Manager.
4. Food Service Equipment Contractor shall utilize authorized Custom Stainless Fabricators as indicated in General Specification Section 2.2. All other fabricators must be submitted for approval prior to bid due date.

END OF SECTION

ITEM # 1 WALK-IN COMBINATION BOX WITH REFRIGERATION

Manufacturer: Kolpak
Qty. One (1)

1. Combination walk-in cooler/freezer
Freezer Compartment Interior Dimensions: 14'-5 1/2" x 7'-4" x 8'-6 1/4"
Walls: 4" Class 1 - Foamed in place Urethane
Interior and Exterior: Galvalume - Embossed 26 Ga
Ceiling: 4" Class 1 - Foamed in place Urethane
Floor Application: 4" Class 1 - Foamed in place Urethane
Type: Standard 1000# ERA
Floor Finish: Galvanized - Smooth -16Ga.
Two (2) ea Light Fixture - Kason 1809 LED 115V/220V
One (1) PC199LOP-2E, 2 HP, RLow Temp Standard Pre-Charged,Air Cooled Hermetic Condensing Unit
Amps: 18.1, Ambient Temperature: 91
Includes Fan Cycle Controls, Amps: 18.1, Ambient Temperature: 91
One (1) EL26-090-2EC-PR-4, RLow Temp, Electric Defrost, Amps: 9.8
Door: 34" x 78" Left Swing Out
Interior and Exterior Door Frame: Galvalume - Embossed 26 Ga
One (1) Kason Handle 28 with Locking Assembly
One (1) Kason Heated Pressure Relief 1825
One (1) Freezer Alarm to Cooler Door
One (1) Light Centered Over Door Opening
Stainless Steel 14 ga threshold
One (1) Heater Wire
Three (3) Kason 1346 Brushed Chrome Adjustable / Spring Assisted Hinge
One (1) Kason 1803 LED w/Bulb, Globe & Nightlight 120V
One (1) Deluxe Display By ArcticFox™ with Battery Backup
Cooler Interior Dimensions: 14'-5 1/2" x 20'-6 1/2" x 8'-6 1/4"
Walls: 4" Class 1 - Foamed in place Urethane
Interior and Exterior: Galvalume - Embossed 26 Ga
Ceiling: 4" Class 1 - Foamed in place Urethane
Floor Application with Vinyl U Shape Flat Bottom Wall Screet
Four (4) Kason 1809 LED 115V/220V Light Fixture
Door: 34" x 78" Left Swing Out
Recessed 8"
Interior and Exterior door frame: Galvalume - Embossed 26 Ga.
Alum .063 Diamond Tread 48" High Kickplate on interior and exterior of door and door frame
One (1) Kason 28 with Locking Assembly Handle

- 1 One (1) Light Centered Over Door Opening
- 2 Two (2) Kason 1346 Brushed Chrome Adjustable / Spring Assisted Hinge
- 3 One (1) Kason 1803 LED Light Fixture w/Bulb, Globe & Nightlight 120V
- 4 One (1) Deluxe Display By ArcticFox™ with Battery Backup

7 ITEM # 2 SECURITY SHELVING

9 Manufacturer: Metro
10 Qty. One (1) Lot

- 12 1. Seven (7) SEC33K3 Super Erecta® Security Unit, stationary, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, 38-1/2"W x 21-1/2"D x 66-13/16"H, no intermediate shelves
- 15 2. Twenty- One (21) 1836NK3 Super Erecta® Shelf, wire, 36"W x 18"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection
- 17 3. Four (4) SEC35EC Super Erecta® Security Unit, mobile, chrome plated finish, 52-3/4"W x 21-1/2"D x 68-1/2"H, no intermediate shelves, (2) 5MP/5MPB casters, NSF
- 19 4. Twelve (12) 1848NC Super Erecta® Shelf, wire, 48"W x 18"D, chrome plated finish, plastic split sleeves are included

23 ITEM # 3 WALK-IN FREEZER

25 Manufacturer: Kolpak
26 Qty. One (1)

- 28 1. Included in Item #1

31 ITEM # 4 SECURITY SHELVING

33 Manufacturer: Metro
34 Qty. One (1) Lot

- 36 1. Six (6) SEC33K3 Super Erecta® Security Unit, stationary, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, 38-1/2"W x 21-1/2"D x 66-13/16"H, no intermediate shelves
- 38 2. Eighteen (18) Super Erecta® Shelf, wire, 36"W x 18"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection

42 ITEM # 5-7 SPARE NO.

45 ITEM # 8 WALK-IN COMBINATION COOLER/FREEZER

47 Manufacturer: Kolpak
48 Qty. One (1)

- 50 1. Combination Cooler/Freezer
- 51 Cooler Interior Dimensions: 6'-0" x 8'-1" x 8'-6 1/4"
- 52 Walls: 4" Class 1 - Foamed in place Urethane
- 53 Interior and Exterior: Galvalume - Embossed 26 Ga
- 54 Ceiling: 4" Class 1 - Foamed in place Urethane
- 55 Interior and Exterior: Galvalume - Embossed 26 Ga
- 56 Floor Application: 4" Class 1 - Foamed in place Urethane
- 57 Type: Standard 1000# ERA
- 58 Floor Finish: Galvanized - Smooth -16Ga.
- 59 One (1) Kason 1809 LED Light Fixture 115V/220V
- 60 One (1) PC149LOP-2EP, 1 1/2 HP, RLow Temp
- 61 Plus w/Headmaster Pre-Charged Air Cooled Hermetic Condensing Unit
- 62 Amps: 12.6, Ambient Temperature: 91

- 1 Includes Head Pressure Control Valve
- 2 One (1) EL26-066-2EC-PR-4, RLow Temp, Electric Defrost, Amps: 9.8
- 3 Door: 34" x 78" Right Swing Out
- 4 Recessed 8"
- 5 Interior and Exterior Door and Door Frame Galvalume - Embossed 26 Ga
- 6 Alum Diamond Tread Kickplate .063, 48" High
- 7 One (1) Kason 28 with Locking Assembly Handle
- 8 One (1) Kason1825 Heated Pressure Relief Vent
- 9 One (1) Light Centered Over Door Opening
- 10 Stainless Steel 14 ga Threshold,
- 11 Three (3) Kason 1346 Brushed Chrome Adjustable / Spring Assisted Hinge
- 12 One (1) Kason 1803 LED w/Bulb, Globe & Nightlight 120V
- 13 One (1) Deluxe Display By ArcticFox™ with Battery Backup
- 14 Freezer Interior Dimensions: 8'-2" x 8'-1" x 8'-6 1/4"
- 15 Walls: 4" Class 1 - Foamed in place Urethane
- 16 Interior and Exterior: Galvalume - Embossed 26 Ga
- 17 Ceiling: 4" Class 1 - Foamed in place Urethane
- 18 Interior and Exterior: Galvalume - Embossed 26 Ga
- 19 Floor Application: Screed, Vinyl U Shape for Male Bottom Walls
- 20 10'-0" Sq. Ft. Wainscot Aluminum Diamond Tread .063, 48"H across the exposed front of box
- 21 One (1) Kason 1809 LED Light Fixture, 115V/220V
- 22 One (1) PC69MOP-2EP, 3/4 HP, RMedium Temp
- 23 Plus w/Headmaster Pre Charged Air Cooled Hermetic Condensing Unit,
- 24 Amps: 7.4, Ambient Temperature: 95
- 25 Includes Head Pressure Control Valve (Headmaster), Amps: 7.4,
- 26 One (1) AM26-073-1EC-PR-4, RMedium Temp, Air Defrost, Amps: 1.6
- 27 Door: 34" x 78" Right Swing Out
- 28 Recessed 8"
- 29 Interior and Exterior Door and Door Frame: Galvalume - Embossed 26 Ga
- 30 Kickplate, Alum .063 Diamond Tread 48" High
- 31 One (1) Kason 28 Handle with Locking Assembly
- 32 One (1) ea Light Centered Over Door Opening
- 33 Three (3) Kason 1346 Brushed Chrome Adjustable / Spring Assisted Hinge
- 34 One (1) ea Light Fixture - Kason 1803 LED w/Bulb, Globe & Nightlight 120V
- 35 One (1) Deluxe Display By ArcticFox™ with Battery Backup

36
37
38 ITEM # 9 BUN / PAN RACK

39
40 Manufacturer: Advance Tabco
41 Qty. Seven (7)
42 Model: PR20-3K-X
43

- 44 1. Mobile Bun Pan Rack, full height, open sides, with 1-1/2" ribbed angle, capacity 20 - 18" x 26" sheet pans,
- 45 bolted extruded aluminum frame, front loading, 69-1/4" high
- 46 2. Seven (7) PRC-1-1 heavy duty plastic rack cover with clear front

47
48
49 ITEM # 10 WALK-IN COOLER SHELVING

50
51 Manufacturer: Focus Foodservice
52 Qty. One (1) Lot
53

- 54 1. Twelve (12) FGN074G Post, 74"H, mobile, grooved at 1" increments, Sanigard™ anti-microbial protection,
- 55 for wet or dry storage, green epoxy finish
- 56 2. Eight (8) FF2448G Wire Shelf, 800 lb. weight capacity, 24"W x 48"L, for wet or dry storage, zinc underplated
- 57 steel wire, green epoxy coated finish
- 58 3. Four (4) FF1842G Wire Shelf, 800 lb. weight capacity, 18"W x 42"L, for wet or dry storage, zinc underplated
- 59 steel wire, green epoxy coated finish

60
61
62 ITEM # 11 WALK-IN FREEZER

- 1
2 Manufacturer: Custom
3 Qty. One (1)
4
5 1. Included in Item #8
6
7
8 ITEM # 12 WALK-IN FREEZER SHELVING
9
10 Manufacturer: Focus Foodservice
11 Qty. One (1) Lot
12
13 1. Twelve (12) Post, 74"H, mobile, grooved at 1" increments, Sanigard™ anti-microbial protection, for wet or
14 dry storage, green epoxy finish
15 2. Four (4) Wire Shelf, 800 lb. weight capacity, 18"W x 42"L, for wet or dry storage, zinc underplated steel wire,
16 green epoxy coated finish
17 3. Eight (8) Wire Shelf, 800 lb. weight capacity, 18"W x 48"L, for wet or dry storage, zinc underplated steel
18 wire, green epoxy coated finish
19
20
21 ITEM # 13-15 SPARE NO.
22
23
24 ITEM # 16 MOBILE STORAGE SHELVING
25
26 Manufacturer: Focus Foodservice
27 Qty. One (1) Lot
28
29 1. Twelve (12) FGN074G Post, 74"H, mobile, grooved at 1" increments, zinc plated leveling feet, for dry
30 storage, chromate finish
31 2. Three (3) FSCASTS5 Caster Set, 5" (12.7 cm) dia., (2) swivel & (2) swivel with brake & bumper, adds 6"H to
32 unit, 250 lbs. capacity per caster, heavy duty, non-marking tread, polyurethane
33 3. Eight (8) FF2448CWire Shelf, 800 lb. weight capacity, 24"W x 48"L, for dry storage, zinc plated steel wire,
34 chromate finish, clear coat
35 4. Four (4) FF2436C Wire Shelf, 800 lb. weight capacity, 24"W x 36"L, for dry storage, zinc plated steel wire,
36 chromate finish, clear coat
37
38
39 ITEM # 17 HAND SINK
40
41 Manufacturer: John Boos
42 Qty. Three (3)
43 Model: PBHS-W-1410-SSLR-X
44
45 1. Pro-Bowl Wall Mount Hand Sink, 14"W x 10" front-to-back x 5" deep bowl, splash mount faucet holes with 4"
46 centers, 1-7/8" drain opening with basket drain, with left & right side splashes, includes mounting bracket, all
47 stainless steel construction
48 2. Three (3) PBF-4SM-3GLF-X Heavy Duty Faucet, splash mount, 3-1/2" gooseneck spout, 4" centers, 1/4 turn
49 ceramic cartridges, color coded hot/cold indicators, integral check valve, 1/2" NPT, chrome finish
50 3. Three (3) Pair PB-SMMK-90 ADA Wrist Blades, stainless steel, (1 pair), use with heavy duty faucets
51 4. Three (3) PB-SMMK-90 Splash Mount Faucet Mounting Kit, includes (2) 1/2" supply nipples, (2) retainer
52 nuts, (2) lock washers, (2) rubber washers and (2) male & female short 90° elbows
53
54
55 ITEM # 18 WASTE CONTAINERS
56
57 Manufacturer: BY OTHER
58 Qty. Eleven (11)
59
60
61 ITEM # 19 SOAP AND TOWEL DISPENSERS
62

**MSR LTD
09 JUNE 2023**

1 Manufacturer: BY OTHER
2 Qty. Three (3)
3
4
5 ITEM # 20 BUSSING UTILITY TRANSPORT CART
6
7 Manufacturer: Lakeside Manufacturing
8 Qty. Three (3)
9 Model: 311A
10
11 1. Light Duty Utility Cart, 3-tier, open base, 300 lbs capacity, 15-1/2" x 24" shelf size, 11-3/4" shelf clearance,
12 (1) push handle with bumpers, (2) bumpers on front legs, allergen-safe purple bumpers, welded angle
13 frame, stainless steel construction, 3-1/2" swivel casters
14
15

16 ITEM # 21 ICE MACHINE AND BIN
17
18 Manufacturer: Follett LLC
19 Qty. One (1)
20 Model: HCC1010ABS
21
22 1. Horizon Elite™ Chewblet® Ice Machine, with RIDE® remote ice delivery equipment, air-cooled, self-
23 contained condenser, for filling Follett ice storage bins, up to 1100 lb production of Chewblet® ice in 24
24 hours
25 2. 208-230/60/1, 11.0 amps, NEMA 6-15P
26 3. Ten Foot (10'-0"L) #00174896 Insulated Polywire Transport Tube, for installations requiring more than the
27 standard 10' length
28 4. One (1) #00174896 Wall Mount Bracket, for Horizon Elite /W and /W RIDE model ice machines
29 5. One (1) #DEV860SG-48-75 Ice-DevIce™ with SmartCART™ 75, 860 lb. bin storage capacity, with front
30 chute, poly liner, SmartGATE ice shield, poly door with PowerHinge™ door hinge, full stainless steel exterior
31 and base, ABS/poly top custom cut for ice machine, includes 82 oz plastic ice scoop, paddle and rake set,
32 and (1) polyethylene cart with hinged lid and (3) polyethylene Totes ice carriers, each carrier holds 25 lb/75
33 lb total per cart, for cube or Chewblet ice only,
34 6. One (1) #00978957 High Capacity Water Filter System for use with all Follett ice machines and ice and
35 water dispensers, filtration capacity
36 7. One (1) #00978965 Replacement Primary Cartridge, for Follett high capacity water filter system filtration
37 capacity, single cartridge
38 8. One (1) #00130211 Replacement Pre-Filter Cartridge, for Follett high capacity carbonless high capacity or
39 standard capacity water filter systems, single cartridge
40 9. One (1) case of (12) #010838652 Nu-Calgon IMS-III Sanitizer
41 10. One (1) case of (6) #01149954 SafeCLEAN Plus, liquid – environmentally responsible ice machine cleaner
42
43

44 ITEM # 22 FLOOR TROUGH
45
46 Manufacturer: Advance Tabco
47 Qty. One (1)
48 Model: FTG-1248
49
50 1. 48"W x 12"D x 4" deep, 14 gauge 304 stainless steel, includes stainless steel subway grating constructed
51 from 3/16" x 1" bars, removable stainless steel strainer basket, 4" O.D. waste pipe 3"L, pitched towards
52 waste
53
54

55 ITEM # 23 SPARE NO.

56
57
58 ITEM # 24 MOBILE WORK TABLE
59
60 Manufacturer: Advance Tabco
61 Qty. Eight (8)
62 Model: SS-304

- 1
- 2 1. Model 22985 Work Table, 48"W x 30"D, 14 gauge 304 stainless steel top, 18 gauge adjustable stainless
- 3 steel undershelf, stainless steel legs
- 4 2. Eight (8) TA-255B heavy duty casters with brakes on all wheels
- 5 3. Eight (8) OTS-12-48 Table mounter overshelfsingle, 48"W x 12"D, 18 gauge 430 stainless steel; mount as
- 6 shown on FS plan
- 7 4. Eight (8) 449699 Square edge on overshelf
- 8 5. Eight (8) set, 78003 Casters, expanding adapter, for 1-5/8" dia. O.D. tube/table legs, 400 lb capacity per
- 9 caster, set of (4), (2) casters with brakes

10
11

12 ITEM # 25 ONE (1) COMPARTMENT SINK

13
14 Manufacturer: Advance Tabco
15 Qty. Three (3)
16 Model: FC-1-1620
17

- 18 1. Single compartment sink without drainboards, bowl size 16" x 20" x 14" deep, 16 gauge 304 stainless steel,
- 19 tile edge splash, rolled edge, 8" OC faucet holes, stainless steel legs with adjustable side cross-bracing, 1"
- 20 adjustable stainless steel bullet feet
- 21 2. Three (3) K-4 Support Bracket, for lever waste drain handle
- 22 3. Three (3) K-495 Turn Down Backsplash with wall clips
- 23 4. Six (6) K-488 Flanged Bullet Foot, on front legs only
- 24 5. Three (3) T&S Brass B-0231 Sink Mixing Faucet, 12" swing nozzle, wall mounted, 8" centers on sink faucet
- 25 with 1/2" IPS eccentric flanged female inlets, lever handles
- 26 6. Three (3) T&S Brass B-0199-01 Aerator, non-splash, 55/64" -27 female aerator threads, fits goosenecks &
- 27 nozzles
- 28 7. Three (3) T&S Brass B-0230-K Installation Kit, (2) 1/2" NPT nipples, lock nuts & washers, (2) short "EII" 1/2"
- 29 NPT female x male
- 30 8. Three (3) T&S Brass B-0230-KIT Inlet Kit, 1/2" NPT nipple, close elbows, 24" flex supply hoses

31
32

33 ITEM # 26 WASTE CONTAINERS

34
35 Manufacturer: BY OTHER
36
37

38 ITEM # 27 PASS-THRU SHELF

39
40 Manufacturer: Advance Tabco
41 Qty. One (1)
42 Model: PA-18-96
43

- 44 1. Pass-Thru Shelf, 96"W x 18"D, bull nose front & rear with square sides, 18/430 stainless steel, 1-5/8"
- 45 stainless steel tubing post, galvanized hat channel, includes: 3" x 4" stainless steel L-brackets to secure to
- 46 wall. Work surface will be 1-1/2" higher than the wall it rests on.
- 47 2. One (1) TA-22A Square edge on pass-thru shelf

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49

50 ITEM # 28-30 SPARE NO.

51
52

53 ITEM # 31 SHELVING, WALL MOUNTED

54
55 Manufacturer: Advance Tabco
56 Qty. One (1)
57 Model: WS-12-48-16
58

- 59 1. Model 463683 Shelf, wall-mounted, 48"W x 12"D, 1-5/8" bullnose front edge, 1-1/2"H rear up-turn, 16/304
- 60 satin finish stainless steel
- 61 2. One (1) TA-22A Square edge on wall shelf

62

- 1
2 ITEM # 32 CLEAN DISHTABLE
3
4 Manufacturer: Advance Tabco
5 Qty. One (1)
6 Model: DTC-S30-72R
7
8 1. Clean Dishtable, straight design, left-to-right operation, 10-1/2"H backsplash, 3" rolled front & side rims,
9 stainless steel legs & crossrails, 71"W x 30"D x 34"H, 14/304 stainless steel
10 2. One (1) K-495 Turn Down Backsplash with wall clips
11 3. Two (2) K-488 Model 70195 Flanged Bullet Foot
12
13
14 ITEM # 33 DISHWASHER, DOOR TYPE
15
16 Manufacturer: Hobart
17 Qty. One (1)
18 Model: AM16T-BASX-2
19
20 1. Dishwasher, door type, tall chamber (27"), high temp sanitizing, (field convertible to single phase), 60
21 racks/hour, straight-thru or corner, digital controls, Sense-A-Temp™ booster, electric tank heat, pumped
22 rinse, pumped drain, auto-fill, stainless steel tank, frame, doors & feet, sheet pan rackENERGY STAR®
23 2. Startup by Factory Trained Technician - Confirmation of correct machine and utility installation; performance
24 check to ensure machine is operating to factory specifications; adjustments as needed, and customer demo.
25 For installations within 100 miles of a Hobart Service Office during normal business hours with appropriate
26 notice; beyond 100 miles contact Hobart Service. See Hobart Service for complete details
27 3. One (1) DWT-AM16 Drain water tempering (single valve) kit with Pumped Drain Air Gap for BAS and Tall
28 models
29 4. One (1) WTRHAMARREST-AM16 Water Hammer Arrestor – Assembly includes 3/4" brass pressure
30 regulator, pressure gauge, shock arrestor and garden hose adapter
31
32
33 ITEM # 34 CONDENSATE HOOD
34
35 Manufacturer: By Others
36
37
38 ITEM # 35-37 SPARE NO.
39
40
41 ITEM # 38 SOILED DISHTABLE
42
43 Manufacturer: Advance Tabco
44 Qty. One (1)
45 Model: DTS-S30-84L
46
47 1. Soil Dishtable, left-to-right, 10-1/2"H backsplash, with pre-rinse sink, stainless steel legs with crossrails front
48 to back, 83"W, 14/304 stainless steel, Includes prerinse basket with slide bar
49 2. Turn Down Backsplash with wall clips
50 3. Two (2) K-488 Flanged Bullet Foot
51 4. One (1) K-452 Control Bracket 8" x 12"
52 5. One (1) T&S Brass B-0455 Vacuum Breaker Unit, 1/2" IPS piping, slip flanges for mounting on 45° surface,
53 6" between piping
54 6. One (1) T&S Brass B-0131-B EasyInstall Pre-Rinse Unit, wall mount mixing faucet with 8" adjustable
55 centers, quarter-turn Eterna cartridges with spring checks, lever handles with color coded indexes, 26"
56 EasyInstall riser with overhead swivel arm, 20" flexible stainless steel hose with heat-resistant gray handle &
57 hold down ring, 1.15 GPM spray valve (B-0107), finger hook, 6" adjustable wall bracket, polished chrome-
58 plated brass faucet body, 1/2" NPT female inlets, CSA
59 7. One (1) T&S Brass B-0230-K Installation Kit, (2) 1/2" NPT nipples, lock nuts & washers, (2) short "EII" 1/2"
60 NPT female x male
61 8. One (1) T&S Brass B-230-KIT Inlet Kit, 1/2" NPT nipple, close elbows, 24" flex supply hoses
62 9. One (1) T&S Brass B-0156 Add-on Faucet, for Pre-Rinse Units, 12" nozzle, includes 3" nipple

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ITEM # 39 DISPOSER W/ PRE-RINSSE SPRAYER

Manufacturer: InSinkErator
Qty. One (1)
Model: SS-200-5-MRS

1. Disposer Package, sink mount system, with #5 adaptor for 3.5" to 4" sink opening, 2 HP motor, stainless steel construction, includes syphon breaker, solenoid valve, flow control valve, manual reverse switch, adjustable leg kit
2. 208V/60/1PH, 7.7 amps

ITEM # 40 WALL SHELF

Manufacturer: Advance Tabco
Qty. One (1)
Model: WS-12-48-16

1. Wall-mounted shelf, 48"W x 12"D, 1-5/8" bullnose front edge, 1-1/2"H rear up-turn, 16/304 satin finish stainless steel
2. One (1) TA-22A Square edge on overshef or wall shelf
3. One (1) TA-60 reduce length as shown on plan

ITEM # 41-44 SPARE NO.

ITEM # 45 SHELVING, WALL MOUNTED

Manufacturer: Advance Tabco
Qty. One (1)
Model: WS-12-48-16 (463683)

1. Model 463683 Shelf, wall-mounted, 48"W x 12"D, 1-5/8" bullnose front edge, 1-1/2"H rear up-turn, 16/304 satin finish stainless steel, NSF
2. One (1) TA-22A Square edge on overshef or wall shelf

ITEM # 46 FOUR (4) COMPARTMENT SINK

Manufacturer: Advance Tabco
Qty. One (1)
Model: FC-4-1824-18RL

1. Fabricated Sink, 4-compartment, 18" right & left drainboards, bowl size 18" x 24" x 14" deep, 16 gauge 304 stainless steel, tile edge splash, rolled edge, (2) sets of 8" OC faucet holes, stainless steel legs with adjustable side cross-bracing, 1" adjustable stainless steel bullet feet, overall 30"D
2. Four (4) K-4 Support Bracket, for lever waste drain handle, (1) support required for each lever drain
3. One (1) K-495 Turn Down Backsplash with wall clips
4. Four (4) K-488 Flanged Bullet Foot
5. One (1) T&S Brass B-0133-12-CRBJK EasyInstall Pre-Rinse Unit, with add-on faucet, splash/wall mount, 8" OC, 44" flexible stainless steel hose with B-0107-J spray valve, 18" riser, add-on faucet with 12" swing spout, lever handles, Cerama cartridges with check valves, 6" wall bracket, 1/2" NPT male elbow installation kit, low lead
6. One (1) T&S Brass B-0231 Sink Mixing Faucet, 12" swing nozzle, wall mounted, 8" centers on sink faucet with 1/2" IPS eccentric flanged female inlets, lever handles
7. One (1) T&S Brass B-0230-KIT Inlet Kit, 1/2" NPT nipple, close elbows, 24" flex supply hoses
8. Four (4) T&S Brass B-3952 Waste Valve, twist handle, 3-1/2" sink opening, 2" drain outlet

- 1 ITEM # 47-49 SPARE NO.
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4 ITEM # 50 KITCHEN HOOD AND ST/ST WALL PANELING
5
6 Manufacturer: By Others
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9 ITEM # 51 FIRE SUPPRESSION SYSTEM
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11 Manufacturer: By Others
12
13
14 ITEM # 52 CONVECTION OVEN
15
16 Manufacturer: Blodgett Oven
17 Qty. One (1)
18 Model: ZEPH-100-G DBL
19
20 1. Zephaire Convection Oven, gas, double-deck, standard depth, capacity (5) 18" x 26" pans per compartment,
21 (SSI-D) solid state infinite controls with digital timer, two speed fan, flue connector, dependent glass doors,
22 interior light, stainless steel front, sides & top, 6" stainless steel legs, 100,000 BTU
23 2. Natural gas
24 3. Two (2) 115V/60/1PH, 6.0 amps, 2-wire with ground, cord & plug, 1/2 hp
25 4. SSI-D Top Oven: Solid State infinite with digital timer, standard
26 5. SSI-D Bottom Oven: Solid State infinite with digital timer, standard
27 6. One (1) set 4" low profile plate casters
28 7. One (1) Gas manifold for double ovens
29 8. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia.,
30 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2)
31 Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow
32 capacity
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34
35 ITEM # 53 TILTING SKILLET BRAISING PAN
36
37 Manufacturer: Crown
38 Qty. One (1)
39 Model: GS-40
40
41 1. Tilting Skillet, gas, 40 gallon capacity, manual tilt, electronic ignition, high temp safety cut-off, removable
42 pour strainer, etched interior markings, stainless steel construction, tubular legs, adjustable bullet feet front,
43 adjustable flanged feet rear, 125,000 BTU
44 2. Natural Gas
45 3. 120V/50/60/1Ph cord and plug
46 4. One (1) PC-3 Pan Carrier
47 5. One (1) SF-12 12" single pantry faucet
48 6. One (1) FB Faucet bracket
49 7. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia.,
50 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2)
51 Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow
52 capacity
53
54
55 ITEM # 54 TILTING KETTLE
56
57 Manufacturer: Crown
58 Qty. One (1)
59 Model: GLT-40
60

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- 1 1. Tilting Kettle, gas, 40 gallon capacity, 2/3 jacket, thermostatic control, electronic ignition, crank tilt, faucet
- 2 bracket, 316 stainless steel interior liner, stainless steel exterior, console & 1-5/8" diameter legs, flanged
- 3 feet, 100,000 BTU, CSA Star, CSA Flame, NSF
- 4 2. Natural Gas
- 5 3. 120V/50/60/1Ph cord and plug
- 6 4. One (1) TVT-2 2" tangent draw off valve includes perforated strainer (location as per spec)
- 7 5. One (1) TPS-2 Perforated Strainer, for 2" draw-offs, standard
- 8 6. One (1) PC-4 Pan Support, for 20-100 gallon tilting kettles
- 9 7. One (1) SF-18 18" single pantry faucet
- 10 8. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia.,
- 11 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2)
- 12 Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow
- 13 capacity

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16 **ITEM # 55** **FLOOR TROUGH**

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Manufacturer: Advance Tabco
Qty. One (1)
Model: FTG-2436

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- 1. Floor Trough, 36"W x 24"D x 4" deep, 14 gauge 304 stainless steel, includes stainless steel subway grating constructed from 3/16" x 1" bars, removable stainless steel strainer basket, 4" O.D. waste pipe 3"L, pitched towards waste

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27 **ITEM # 56** **FLOOR TROUGH**

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Manufacturer: Advance Tabco
Qty. One (1)
Model: FTG-2436

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- 1. Floor Trough, 36"W x 24"D x 4" deep, 14 gauge 304 stainless steel, includes stainless steel subway grating constructed from 3/16" x 1" bars, removable stainless steel strainer basket, 4" O.D. waste pipe 3"L, pitched towards waste, NSF

37
38

38 **ITEM # 57** **SPARE NO.**

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41 **ITEM # 52** **CONVECTION OVEN**

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46

Manufacturer: Blodgett Oven
Qty. One (1)
Model: ZEPH-100-G DBL

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- 1. Zephaire Convection Oven, gas, double-deck, standard depth, capacity (5) 18" x 26" pans per compartment, (SSI-D) solid state infinite controls with digital timer, two speed fan, flue connector, dependent glass doors, interior light, stainless steel front, sides & top, 6" stainless steel legs, 100,000 BTU

50

2. Natural gas

51

3. Two (2) 115V/60/1PH, 6.0 amps, 2-wire with ground, cord & plug, 1/2 hp

52

4. SSI-D Top Oven: Solid State infinite with digital timer, standard

53

5. SSI-D Bottom Oven: Solid State infinite with digital timer, standard

54

6. One (1) set 4" low profile plate casters

55

7. One (1) Gas manifold for double ovens

56

8. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia.,

57

48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2)

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59
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Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow

capacity

62

62 **ITEM # 59** **THERMOSTATIC GRIDDLE**

1
2 Manufacturer: Southbend
3 Qty. One (1)
4 Model: 436D-3T
5
6 1. Ultimate Restaurant Range, gas, 36" griddle, thermostatic controls, standing pilot, (1) standard oven with
7 battery spark ignition, includes (1) rack, 22-1/2" flue riser with shelf, stainless steel front, sides, shelf &
8 casters, 2 locking, 109,000 BTU
9 2. One (1) 22.5" high flue riser, with heavy duty shelf
10 3. Natural Gas
11 4. Battery spark ignition
12 5. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia.,
13 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2)
14 Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow
15 capacity
16
17

18 ITEM # 60 CHARBROILER

19
20 Manufacturer: Southbend
21 Qty. One (1)
22 Model: 436D-3C
23
24 1. Ultimate Restaurant Range, gas, 36" charbroiler, standing pilot, (1) standard oven with battery spark ignition,
25 includes (1) rack, 22-1/2" flue riser with shelf, stainless steel front, sides, shelf & casters, 141,000 BTU
26 2. 22.5" high flue riser, with heavy duty shelf, standard
27 3. Natural Gas
28 4. 10" riser in lieu of standard 22.5" high back riser
29 5. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Hose Assembly, 3/4" inside dia.,
30 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (2)
31 Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow
32 capacity
33
34

35 ITEM # 61 6 BURNER RANGE

36
37 Manufacturer: Southbend
38 Qty. One (1)
39 Model: X-4361D
40
41 1. Restaurant Range, gas, 36", (6) non-clog burners, standard grates, standing pilot, (1) standard oven with
42 battery spark ignition, includes (1) rack, 22-1/2" flue riser with shelf, stainless steel front, sides, shelf &
43 casters, 243,000 BTU
44 2. Natural Gas
45 3. One (1) Dormont 1675BPQ2SR48 Blue Hose™ Moveable Gas Connector Connector Hose Assembly, 3/4"
46 inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast®
47 QD, (2) Swivel MAX®, (1) Snap'N Go, coiled restraining cable with hardware, 160,000 BTU/hr minimum flow
48 capacity
49
50

51 ITEM # 62 KITCHEN HOOD

52
53 Manufacturer: By Other
54
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56 ITEM # 63-65 SPARE NO.

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58
59 ITEM # 64 STAINLESS STEEL PANELS AND END CAPS.
60

61 Manufacturer: By Other
62

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SECTION 11 51 00

COMMON REQUIREMENTS FOR EQUIPMENT

PART 1 – GENERAL

- 1.1 [RELATED DOCUMENTS](#)
- 1.2 [SUMMARY](#)
- 1.3 [RELATED WORK BY OTHER TRADES](#)
- 1.4 [ACTION SUBMITTALS](#)
- 1.5 [INFORMATIONAL SUBMITTALS](#)
- 1.6 [CLOSEOUT SUBMITTALS](#)
- 1.7 [QUALITY ASSURANCE](#)
- 1.8 [GUARANTEE](#)
- 1.9 [SUBMITTALS](#)
- 1.10 [PRODUCT STORAGE, DELIVERY AND HANDLING](#)

PART 2 – PRODUCTS

- 2.1 [PRODUCTS](#)
- 2.2 [EQUIPMENT SCHEDULE](#)

PART 3 – EXECUTION

- 3.1 [EXAMINATION](#)
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- 3.4 [ELECTRICAL REQUIREMENTS](#)
- 3.5 [PLUMBING REQUIREMENTS](#)
- 3.6 [CLEANING](#)
- 3.7 [UTILIZATION](#)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Facility equipment installed per equipment schedule and responsibility matrix.
- B. Related Sections:
 - 1. Section 01 10 00 "Summary" for Owner provided equipment installed by Contractor.

1.3 RELATED WORK BY OTHER TRADES

- A. General Contractor (GC):
 - 1. Provide core drilling and sleeves in floors, wall sleeves, concrete equipment pads and roof curbs with pitch pockets for refrigeration system components.
 - 2. Provide concealed wall backing of size and type and at locations indicated on shop drawings submitted by the Equipment Manufacturer.
- B. Plumbing Contractor (PC):
 - 1. Provide rough-in and final connections of all plumbing services. Flush all lines of foreign matter before connecting fixtures.
- C. Electrical Contractor (EC):
 - 1. Provide rough-in and final connections of all electrical services. Install electrical devices furnished by Equipment Manufacturer and indicated on Electrical Schedule. Wet areas such as sinks, disposers or dishwashers shall be wired in Sealtite Type EF conduit or equal, thru water-proof boxes.
 - 2. Provide receptacles, conduit, contactors, controllers, switches, disconnects, starters, etc., unless indicated in the Electrical Schedule as furnished by the Equipment Manufacturer.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, furnished accessories, and finishes for each appliance.

- 1 **1.5 INFORMATIONAL SUBMITTALS**
2 A. Warranties: Sample of special warranties.
- 3 **1.6 CLOSEOUT SUBMITTALS**
4 A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance
5 manuals.
- 6 **1.7 QUALITY ASSURANCE**
7 A. Comply with all federal, state and local laws and regulations governing materials, installation, health, safety,
8 fire and electrical requirements within the applicable jurisdiction.
9 B. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and
10 maintenance of units required for this Project.
11 C. Regulatory Requirements: Comply with the following:
12 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a qualified testing
13 agency, and marked for intended location and application.
14 D. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply
15 with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines
16 and ICC/ANSI A117.1.
17 E. Preinstallation Conference: Conduct conference at Project site.
18 F. If, because of jurisdictional trade agreements or other conditions, any work specified in the Contract
19 Documents must be done by others, sublet such work only to those who are qualified to do such work or
20 make other arrangements at the expense of the Equipment Manufacturer, subject to approval by the Architect.
- 21 **1.8 GUARANTEE**
22 A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace
23 residential appliances or components that fail in materials or workmanship within specified warranty period.
- 24 **1.9 SUBMITTALS**
25 A. Submit shop and rough-in drawings, schedules and three buy-out brochure manuals within 30 days of award
26 of contract or as required by the Architect. Submit each page for review in quantities required by the
27 Architect.
28 B. Electronic shop drawings and rough-in drawings, when required by the Architect shall be in AutoCAD or
29 AutoCAD compatible format and buy-out books shall be in Word or PDF format.
30 C. When manuals are approved submit assembled brochures in quantity required by the Architect. Provide a
31 numbered cover sheet for each Item that includes a copy of the Specification for that Item. Manuals are to
32 indicate accessories and components used with each Item. Cross out models or accessories shown on
33 catalog sheets but not required by the Specifications.
34 D. When buy-out brochures are received by the Owner and Architect, purchasing may begin. The approvals shall
35 not relieve the Equipment Manufacturer of responsibility for conformance with the Contract Documents unless
36 written approval of change is obtained from the Owner or the Owner's representative.
37 E. Prior to demonstration and final inspection submit three copies of operation and maintenance manuals to
38 Architect for approval. Manuals shall be in hard cover three-ring binders, electronic copy in Word or PDF
39 format and shall include replacement parts lists and a typewritten sheet listing names, addresses and phone
40 numbers of all service agencies to be involved, with reference to the names and item numbers of the pieces of
41 equipment each services. Provide a typewritten index sheet showing, in numerical order, the item numbers
42 and corresponding model and serial number for each piece of equipment.
- 43 **1.10 PRODUCT STORAGE, DELIVERY AND HANDLING**
44 A. All shipping, storage and delivery costs for equipment furnished by the Equipment Manufacturer shall accrue
45 to the Equipment Manufacturer.
46 B. Do not deliver equipment until authorized by the GC. Verify storage areas with the GC prior to delivery. Verify
47 delivery route and building access prior to fabrication or installation.
48 C. Equipment shall be wrapped and crated at the factory and shall be delivered in undamaged condition.
49 Equipment Manufacturer shall be responsible for loss or damage to equipment until final inspection and
50 acceptance by the Owner. Store all equipment and materials in such a manner as to prevent damage due to
51 moisture, foreign material and impact.
52

1 **PART 2 - PRODUCTS**

2 **2.1 PRODUCTS**

3 A. GENERAL

- 4 1. All equipment shall be manufacturer's latest model. An item of equipment specified by model number
5 shall include all accessories the manufacturer includes as standard with the equipment as well as
6 specified optional accessories.
7 2. The manufacturing facilities used for custom fabricated equipment shall at all times be accessible for
8 the Architect and Consultant to inspect the materials and general construction and progress of the
9 Work.

10 **2.2 EQUIPMENT SCHEDULE**

- 11 A. Refer to attached equipment schedule and responsibility matrix.

12 **PART 3 - EXECUTION**

13 **3.1 EXAMINATION**

- 14 A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation
15 tolerances, power connections, and other conditions affecting installation and performance of residential
16 appliances.
17 B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance
18 installation.
19 C. Examine walls, ceilings, and roofs for suitable conditions where overhead exhaust hoods and microwave
20 ovens with vented exhaust fans will be installed.
21 D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
22 E. Proceed with installation only after unsatisfactory conditions have been corrected.

23 **3.2 INSTALLATION, GENERAL**

- 24 A. General: Comply with manufacturer's written instructions.
25 B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area.
26 Verify that clearances are adequate to properly operate equipment.
27 C. Utilities: Comply with plumbing and electrical requirements.
28 D. General:
29 1. Furnish to appropriate trades at a sufficiently early date all equipment and accessories to be installed
30 by that trade.
31 2. All plumbing and electrical and HVAC components scheduled to be installed by separate trades shall
32 be tagged with item numbers and given to those trades. Obtain a receipt for same.
33 3. Any existing equipment scheduled to be re-used or disposed of shall be disconnected by the
34 appropriate trade. Relocate and install those items according to instructions given for new equipment
35 and in accordance with instructions given in the Equipment Schedule.
36 4. Remove crating and rubbish on a daily basis. Verify with GC on availability of on-site trash disposal
37 area.

38 **3.3 INSTALLATION**

- 39 A. Provide a competent foreman to direct the Work and to advise counsel other trades regarding proper
40 installation and connection of the equipment, per manufacturer's instructions. Assist trades in temporary
41 relocation of equipment as required to make connections. Instruct trades on equipment manufacturer's
42 connection details. Align and level equipment as connections are completed.
43 B. Set and level all non-mobile equipment to the correct height and anchor where indicated and/or required for
44 secure installation. Use concealed anchors wherever possible. Anchors are to be noncorrosive and of
45 adequate size for the Work. Align adjoining pieces of equipment for flush fit wherever applicable.

46 **3.4 ELECTRICAL REQUIREMENTS**

- 47 A. Comply with standards of NEC, UL and NEMA and with the requirements of the prevailing code authority.
48 B. Provide attached cord sets where cords are indicated on the Equipment Schedule. Cordsets are to be
49 neoprene, of adequate length. EC to match receptacle to cap.

1 **3.5 PLUMBING REQUIREMENTS**

2 A. All plumbing work shall be in accordance with prevailing codes and regulations.

3 **3.6 CLEANING**

4 A. When installation is complete, remove all tape from the equipment and all debris from the work areas and
5 leave the facility broom clean. Equipment is to be left free of dirt and reasonably free of dust. Final cleaning
6 is to be done by Owner.

7 **3.7 UTILIZATION**

8 A. Commissioning:

9 1. Equipment shall be started and tested by factory-authorized service agencies.
10 2. Lubricate, start-up, test and adjust equipment prior to Owner's inspection and demonstration. Repair or
11 replace equipment that is not fully operational or is noisy or vibrating. When cleaning and testing and
12 adjusting is complete, notify Architect in writing.

13 B. Operation and Use:

14 1. When cleaning, testing and adjusting have been completed and operation and maintenance manuals
15 approved, arrange for demonstration times at Owner's convenience but during normal working hours.
16 Demonstrations shall be done by competent, trained personnel, thoroughly familiar with the operation,
17 techniques of usage, capacities and maintenance of the equipment.
18 2. The Equipment Manufacturer contract representative for this Project shall be present at all equipment
19 demonstrations.
20 3. Furnish all warranty cards and advise Owner to complete and file the registrations. Demonstration and
21 instruction may take up to two full days.

22 **END OF SECTION**

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SECTION 11 51 01

OWNER PROVIDED EQUIPMENT

ID	Short Name	Location	Specific	Purchaser	Installer	Spec Data
REF-1	OWNER PROVIDED UNDER COUNTER FRIDGE	COMFORT ROOM 209	A/E	CITY	CITY	MFR: Summit Appliances STYLE: 24" Wide Built-In All-Refrigerator, ADA Compliant SKU: FF7LBLEBSBADA NOTE: Locking Door;
REF-2	OWNER PROVIDED REFRIGERATOR	ADMIN OFFICE 201	A/E	CITY	CITY	MFR: GE STYLE: SIDE BY SIDE REFRIGERATOR FREEZER SKU: GSS25GSHSS NOTE: STAINLESS STEEL
MICRO-1	OWNER PROVIDED MICROWAVE	ADMIN OFFICE 201	A/E	CITY	CITY	MFR: GE STYLE: COUNTER TOP MICROWAVE SKU: JES1145SHSS NOTE: STAINLESS STEEL
LIFT-1	SCISSOR LIFT	LOADING 152	A/E	CITY	GC	MFR: KELLEY PRODUCT: HULK SERIES KDL DOCK LIFT MODEL: KDL68-6 CAPACITY: 6,000LB COLOR: BLACK INCLUDE BOLLARD w/ BUMPERS (BOLLARD-1)
LOCK-1A	VENDOR STORAGE LOCKER	LOCKERS 150.3	A/E	CITY	CITY	MFR: FOREMAN STYLE: PHENOLIC Z-TIER US-STYLE LOCKER WITH BENCH COLOR: BLACK LOCK: FOREMAN HASP SIZE: 12"X12"X60" NOTE: WITH COORDINATING SLOPE TOP ATTACHMENT
LOCK-1B	VENDOR STORAGE LOCKER	LOCKERS 150.3	A/E	CITY	CITY	MFR: FOREMAN STYLE: PHENOLIC Z-TIER US-STYLE LOCKER COLOR: BLACK LOCK: FOREMAN HASP SIZE: 12"X12"X60" NOTE: WITH COORDINATING SLOPE TOP ATTACHMENT
TV-1	MONITOR [TV]	DIRECTORS OFFICE 202	CITY	CITY	CITY	SELECTION BY OWNER
TV-2	MONITOR [TV]	MARKET SEATING 213	CITY	CITY	CITY	SELECTION BY OWNER
BALE-1	LOW-HEADROOM CARDBOARD BALER	LOADING 152	A/E	CITY	GC	MFR: BRAIDAN MODEL: X25 FINISH: SUBMIT MANUF'S STANDARD FOR SELECTION DIMENSION: 69"W X 50"D X 79"H BALE SIZE: 48"W X 30"D X 30" H POWER: 208/230/480 V 3-PHASE
BIN-1	WASTE COLLECTION CART	LOADING 152	A/E	CITY	CITY	
BIN-2	RECYCLING COLLECTION CART	LOADING 152	A/E	CITY	CITY	
DUMP-1	SELF CONTAINED COMPACTING DUMPSTER	TRASH ENCLOSURE	CITY	CITY	CITY	
SHELF-1	VENDOR STORAGE	VENDOR DRY STORAGE LOCKERS 151 & 215	A/E	CITY	CITY	MFR: ULINE; STYLE: Stainless Steel Wire Shelving Unit - 60 x 24 x 86"; MODEL: H-6154;
SHELF-2	VENDOR STORAGE	VENDOR DRY STORAGE LOCKERS 151 & 215, STORAGE 118	A/E	CITY	CITY	MFR: ULINE; STYLE: Stainless Steel Wire Shelving Unit - 48 x 24 x 86"; MODEL: H-6153;
SHELF-3	VENDOR STORAGE	VENDOR DRY STORAGE LOCKERS 151 & 215	A/E	CITY	CITY	MFR: ULINE; STYLE: Stainless Steel Wire Shelving Unit - 36 x 18 x 86"; MODEL: H-6148;
SHELF-4	VENDOR STORAGE	VENDOR DRY STORAGE LOCKERS 151 & 215	A/E	CITY	CITY	MFR: ULINE; STYLE: Stainless Steel Wire Shelving Unit - 60 x 24 x 72"; MODEL: H-4298;
SHELF-5	VENDOR STORAGE	VENDOR DRY STORAGE LOCKERS 151 & 215	A/E	CITY	CITY	MFR: ULINE; STYLE: Stainless Steel Wire Shelving Unit - 36 x 18 x 72"; MODEL: H-5479;

3
4

END OF SECTION

1 SECTION 12 36 16

2 METAL COUNTERTOPS

3 PART 1 – GENERAL

4 [1.1 RELATED DOCUMENTS](#)

5 [1.2 SUMMARY](#)

6 [1.3 COORDINATION](#)

7 [1.4 ACTION SUBMITTALS](#)

8 [1.5 DELIVERY, STORAGE, AND HANDLING](#)

9 [1.6 FIELD CONDITIONS](#)

10 PART 2 – PRODUCTS

11 [2.1 STAINLESS-STEEL FABRICATIONS \(SSTL-1\)](#)

12 [2.2 MATERIALS](#)

13 [2.3 STAINLESS-STEEL FINISH](#)

14 PART 3 – EXECUTION

15 [3.1 EXAMINATION](#)

16 [3.2 INSTALLATION](#)

17 [3.3 CLEANING AND PROTECTION](#)

18 PART 1 - GENERAL

19 1.1 RELATED DOCUMENTS

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

22 1.2 SUMMARY

- 23 A. Section Includes:

- 24 1. Stainless-steel countertops.
25 2. Stainless-steel wall-mounted shelves.

- 26 B. Related Requirements:

- 27 1. Section 01 81 13.14 "Sustainable Design Requirements" for submittal and product requirements.

28 1.3 COORDINATION

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

32 1.4 ACTION SUBMITTALS

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

- 34 B. Sustainable Design Submittals:

- 35 1. Product Data: For sealants, indicating VOC content.
36 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting
37 materials.

- 38 C. Shop Drawings: For metal fabrications.

- 39 1. Include plans, sections, details, and attachments to other work. Detail fabrication and installation,
40 including field joints.
41 2. For countertops, show locations and sizes of cutouts and holes for items installed in metal
42 countertops.
43 3. For wall-mounted shelves, indicate requirements for blocking or reinforcements in supporting
44 construction.

45 1.5 DELIVERY, STORAGE, AND HANDLING

- 46 A. Deliver products only after casework and supports on which they will be installed has been completed in
47 installation areas.

- 48 B. Keep finished surfaces of products covered with polyethylene film or other protective covering during
49 handling and installation.

1 **1.6 FIELD CONDITIONS**

- 2 A. Field Measurements: Where products are indicated to fit to other construction, verify dimensions of other
3 construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
4 Coordinate fabrication schedule with construction progress to avoid delaying the Work.

5 **PART 2 - PRODUCTS**

6 **2.1 STAINLESS-STEEL FABRICATIONS (SSTL-1)**

- 7 A. Countertops: Fabricate from 0.062-inch-thick, stainless-steel sheet. Provide smooth, clean exposed tops
8 and edges in uniform plane, free of defects. Provide front and end overhang of 1 inch over the base
9 cabinets.
10 1. Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated.
11 2. Weld shop-made joints.
12 3. Sound deaden the undersurface with heavy-build mastic coating.
13 4. Extend the top down to provide a 1-inch-thick edge with a 1/2-inch return flange.
14 5. Form the backsplash coved to and integral with top surface, with a 1/2-inch-thick top edge and 1/2-
15 inch return flange.
16 6. Provide raised (marine) edge around perimeter of tops containing sinks; pitch tops containing sinks
17 two ways to provide drainage without channeling or grooving.
18 B. Wall-Mounted Shelves: Fabricate from stainless-steel sheet, not less than 0.050-inch nominal thickness.
19 Weld shop-made joints. Fold front edge down a minimum of 3/4 inch; fold back edge up a minimum of 3
20 inches. Provide integral stiffening brackets, formed by folding up ends a minimum of 3/4 inch and by
21 welding to upturned edges.

22 **2.2 MATERIALS**

- 23 A. Stainless-Steel Sheet: ASTM A240/A240M, Type 304.
24 B. Sealant for Countertops: Manufacturer's standard sealant that complies with applicable requirements in
25 Section 07 92 00 "Joint Sealants" and the following:
26 1. Mildew-Resistant Joint Sealant: Mildew resistant, single component, nonsag, neutral curing,
27 silicone.
28 2. Color: Clear.
29 3. Verify sealant has a VOC content of 250 g/L or less.

30 **2.3 STAINLESS-STEEL FINISH**

- 31 A. Grind and polish surfaces to produce uniform, directional satin finish matching No. 4 finish, with no
32 evidence of welds and free of cross scratches. Run grain with long dimension of each piece. When
33 polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave
34 surfaces clean.

35 **PART 3 - EXECUTION**

36 **3.1 EXAMINATION**

- 37 A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and
38 other conditions affecting performance of products.
39 B. Proceed with installation only after unsatisfactory conditions have been corrected.

40 **3.2 INSTALLATION**

- 41 A. Install metal countertops level, plumb, and true; shim as required, using concealed shims.
42 B. Field Jointing: Where possible, make field jointing in the same manner as shop jointing; use fasteners
43 recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and
44 edge surfaces is not required. Locate field joints where shown on Shop Drawings.
45 C. Secure countertops to cabinets with Z- or L-type fasteners or equivalent; use two or more fasteners at
46 each front, end, and back.
47 D. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.
48 E. Seal junctures of countertops, splashes, and walls with sealant for countertops.
49 F. Wall-Mounted Shelves: Fasten to supporting construction through upturned back edge at not less than 24
50 inches o.c.
51 1. For framed construction, fasten through wall or partition finishes directly to framing, blocking, or
52 reinforcements.

- 1 **3.3 CLEANING AND PROTECTION**
2 A. Repair or remove and replace defective work as directed on completion of installation.
3 B. Clean finished surfaces. Remove and replace damaged products or touch up and refinish damaged areas
4 to match original factory finish, as approved by Architect.
5 C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape
6 to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

7 **END OF SECTION**

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SECTION 12 36 61
SIMULATED STONE COUNTERTOPS

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12 [2.2 COUNTERTOP MATERIALS](#)
13 PART 3 – EXECUTION
14 [3.1 INSTALLATION](#)

15 **PART 1 - GENERAL**

16 **1.1 RELATED DOCUMENTS**

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

19 **1.2 SUMMARY**

- 20 A. Section Includes:
21 1. Quartz agglomerate countertops and backsplashes.
22 B. Related Requirements:
23 1. Section 01 81 13.14 “Sustainable Design Requirements” for submittal and product requirements.

24 **1.3 ACTION SUBMITTALS**

- 25 A. Product Data: For countertop materials.
26 B. Sustainable Design Submittals:
27 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content
28 and cost.
29 2. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
30 3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting
31 materials.
32 C. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of
33 joining, and cutouts for plumbing fixtures.
34 D. Samples: For each type of material exposed to view.

35 **1.4 QUALITY ASSURANCE**

- 36 A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-
37 accredited certification body.
38 B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification
39 body.

40 **1.5 PROJECT CONDITIONS**

- 41 A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are
42 installed but before countertop fabrication is complete.

43 **1.6 COORDINATION**

- 44 A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

1 **PART 2 - PRODUCTS**

2 **2.1 QUARTZ AGGLOMERATE COUNTERTOPS (SSF-1)**

- 3 A. Configuration: Provide countertops with the following front and backsplash style:
- 4 1. Front: Refer to Drawings.
 - 5 2. Backsplash: Refer to Drawings.
 - 6 3. Endsplash: Refer to Drawings.
- 7 B. Countertops: 3/4-inch thick, quartz agglomerate with front edge built up with same material.
- 8 C. Backsplashes: 3/4-inch-thick, quartz agglomerate.
- 9 D. Material: Silestone – Polished Marengo.

10 **2.2 COUNTERTOP MATERIALS**

- 11 A. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of
12 Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions
13 from Indoor Sources Using Environmental Chambers."
- 14 B. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled
15 plastic resin and complying with the "Physical Characteristics of Materials" Article of ANSI SS1.
- 16 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
17 that may be incorporated into the Work include, but are not limited to, the following:
 - 18 a. Caesarstone.
 - 19 b. Cosentino USA. (Silestone).
 - 20 2. Colors and Patterns: Match Architect's samples.
 - 21 a. Refer to Material ID List

22 **PART 3 - EXECUTION**

23 **3.1 INSTALLATION**

- 24 A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m).
- 25 B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Align
26 adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with
27 manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean
28 entire surface.

29 **END OF SECTION**

**SECTION 12 93 00
SITE FURNISHINGS**

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- PART 1 – GENERAL
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- PART 2 – PRODUCTS
 - 2.1 BICYCLE RACKS
 - 2.2 BICYCLE REPAIR STATION
 - 2.3 GENERAL FINISH REQUIREMENTS
- PART 3 – EXECUTION
 - 3.1 EXAMINATION
 - 3.2 INSTALLATION, GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Bicycle racks.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including physical characteristics such as shape, dimension, capacity and finish for each type of site furnishings.
- B. Shop Drawings: Provide shop drawings for each type of site furnishing indicating installation details.
- C. LEED Submittals:
 - 1. Product Data for Credit MR 4.1 and Credit MR 4.2: For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content. Include statement indicating cost for each product having recycled content.
- D. Samples: For each exposed product and for each color and texture specified.
- E. Samples for Verification: For each type of exposed finish, not less than 6-inch- long linear components and 4-inch-square sheet components.
- F. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For site furnishings.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For site furnishings to include in maintenance manuals. Include recommended methods for repairing damage to the finish.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing site furnishings similar to those required for this project and with a record of successful in-service performance.
- B. Source Limitations: Obtain each color, finish, shape and type of site furnishing from a single source with resources to provide components of consistent quality in appearance and physical properties.

PART 2 - PRODUCTS

2.1 BICYCLE RACKS

- A. Description: Steel bike racks
- B. Basis of Design: Shark Single Sided Bike Rack and U Bike Rack with Lean Bar by Madrax Division, Gerber Manufacturing, Inc. (800)448-7931, sales@madrax.com; www.madrax.com.

- 1 C. Refer to Drawings for quantities and locations.
- 2 D. Finish: Hot dip galvanized.
- 3 E. Mounting: Surface (flange) ground mount for each rack as indicated in manufacturer's standard
4 specifications and detail drawings.
- 5 F. Hardware: Provide Grade 316 stainless steel, tamper-proof anchoring hardware in sizes and quantities
6 indicated by manufacturer's standard specifications and detail drawings.
- 7 G. Installation: Install and anchor to concrete pavements per manufacturer's standard specifications and
8 detail drawings.
- 9

10 **2.2 BICYCLE REPAIR STATION**

- 11 A. Description: Steel bike racks
- 12 B. Basis of Design: "Fixit Rack" and additional "Air Kit 2 Bike Pump" by Dero, www.dero.com,
- 13 C. (888)-337-6729.
- 14 D. Refer to Drawings for quantities and locations.
- 15 E. Finish: Hot dip galvanized with electrostatically applied primer and UV-resistant polyester powder coat of
16 no less than 6 mils for body of rack and pump. Stainless steel cables for tool tethers to attach tools to
17 body.
- 18 F. Color: Eggplant (dark purple).
- 19 G. Mounting: Surface (flange) ground mount for each rack as indicated in manufacturer's standard
20 specifications and detail drawings.
- 21 H. Tools: Manufacturer-provided hand tools including Philips and flat head screwdrivers; 2.5, 3, 4, 5, 6, and 8
22 mm Allen wrenches; headset wrench; pedal wrench; 8, 9, 10 and 11mm box wrenches; and tire levers.
- 23 I. Hardware: Provide Grade 316 stainless steel, tamper-proof anchoring hardware in sizes and quantities
24 indicated by manufacturer's standard specifications and detail drawings.
- 25 J. Installation: Install and anchor to concrete pavements for specific rack + pump configuration indicated in
26 manufacturer's standard specifications and detail drawings. Confirm final location, configuration and offset
27 distances to adjacent paths, walls, buildings, etc with manufacturer's recommended setbacks and
28 Construction Representative prior to fastening to concrete.
- 29
- 30

31 **PART 3 - EXECUTION**

32
33 **3.1 EXAMINATION**

- 34 A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and
35 level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance
36 of the Work.
- 37 B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 38

39 **3.2 INSTALLATION, GENERAL**

- 40 A. Comply with manufacturer's written installation instructions unless more stringent requirements are
41 indicated. Complete field assembly of site furnishings where required.
- 42 B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- 43 C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.
- 44 D. Clean all site furnishings after installation and inspect for damage. Document any damage to installed
45 furnishings and provide documentation to Owner; repair damage per manufacturer's recommendations OR
46 be responsible for a full replacement of any site furnishings with damage that exceeds small repairs or
47 touch-ups as determined by the Owner.
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END OF SECTION

SECTION 14 24 10

MRL HYDRAULIC TRACTION ELEVATORS

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- 14 2.04 POWER UNIT
- 15 2.05 HOISTWAY ENTRANCES
- 16 2.06 CAR ENCLOSURE
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- 21 2.11 MISCELLANEOUS ELEVATOR COMPONENTS
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- 25 3.03 FIELD QUALITY CONTROL
- 26 3.04 ADJUSTING
- 27 3.05 CLEANING
- 28 3.06 PROTECTION
- 29 3.07 DEMONSTRATION
- 30 3.08 ELEVATOR SCHEDULE

31 PART 1 - **GENERAL**

32 **1.1 SUMMARY**

- 33 A. Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:
 - 34 1. Standard pre-engineered hydraulic passenger elevators.
 - 35 2. Elevator car enclosures, hoistway entrances and signal equipment.
 - 36 3. Jack(s).
 - 37 4. Operation and control systems.
 - 38 5. Accessibility provisions for physically disabled persons.
 - 39 6. Equipment, machines, controls, systems and devices as required for safely operating the specified
 - 40 elevators at their rated speed and capacity.
 - 41 7. Materials and accessories as required to complete the elevator installation.
- 42 B. Related Sections:
 - 43 1. Division 1 General Requirements: Meet or exceed all referenced sustainability requirements.
 - 44 2. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
 - 45 3. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
 - 46 4. Division 5 Metals:
 - 47 a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams
 - 48 for supporting guide-rail brackets.
 - 49 b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
 - 50 5. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop
 - 51 primed ferrous materials.
 - 52 6. Division 22 Plumbing:
 - 53 a. Sump pit and oil interceptor.
 - 54 7. Division 23: Heating and Ventilation:
 - 55 a. Heating and ventilating hoistways.
 - 56 8. Division 26 Sections: Electrical:

- 1 a. Providing electrical service to elevators. (note: fused disconnect switch to be provided as
- 2 part of elevator manufacture product, refer to miscellaneous elevator components for further
- 3 details.)
- 4 b. Heat and smoke sensing devices.
- 5 c. Convenience outlets and illumination in hoistway and pit.
- 6 9. Division 28: Electronic Safety and Security:
- 7 a. Access control systems (Keyscan) for restricted elevator door access.
- 8 C. Work Not Included: General contractor shall provide the following in accordance with the requirements of
- 9 the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Section 300 for
- 10 hydraulic elevators. State or local requirements shall be used if more stringent.
- 11 1. Elevator hoist beam to be provided at top of elevator shaft. Beam must be able to accommodate
- 12 proper loads and clearances for elevator installation and operation.
- 13 2. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets,
- 14 supports and bracing including all setting templates and diagrams for placement.
- 15 3. Hatch walls require a minimum two hours of fire rating. Hoistway shall be clear and plumb with
- 16 variations not to exceed 1/2 inch at any point.
- 17 4. Elevator hoistways shall have barricades, as required.
- 18 5. Install bevel guards at 75 degree on all recesses, projections or setbacks over 2 inches (4 inches
- 19 for A17.1 2000 areas) except for loading or unloading.
- 20 6. Provide rail bracket supports at pit, each floor and roof. For guide rail bracket supports, provide
- 21 divider beams between hoistway at each floor and roof.
- 22 7. Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from
- 23 rails and buffers.
- 24 D. Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible
- 25 material extending 42 inches minimum, (48 inches' minimum for A17.1-2000 areas) shall be provided at
- 26 the same height, above sill of access door or handgrips.
- 27 1. All wire and conduit shall run remote from the hoistways.
- 28 2. When heat, smoke or combustion sensing devices are required, connect to elevator control cabinet
- 29 terminals. Contacts on the sensors shall be sided for 12 volt D.C.
- 30 3. Install and furnish finished flooring in elevator cab.
- 31 4. Finished floors and entrance walls are not to be constructed until after sills and door frames are in
- 32 place. Consult elevator contractor for rough opening size.
- 33 5. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough
- 34 walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at
- 35 landings.
- 36 6. To maintain legal fire rating (masonry construction), door frames are to be anchored to walls and
- 37 properly grouted in place.
- 38 7. The elevator wall shall interface with the hoistway entrance assembly and be in strict compliance
- 39 with the elevator contractor's requirements.
- 40 8. General Contractor shall fill and grout around entrances, as required.
- 41 9. All walls and sill supports must be plumb where openings occur.
- 42 10. Locate a light fixture (200 lx / 19 fc) and convenience outlet in pit with switch located adjacent to the
- 43 access door.
- 44 11. Provide telephone line, light fixture (200 lx / 19 fc), and convenience outlet in the hoistway at the
- 45 landing where the elevator controller is located. Typically this will be at the landing above the first
- 46 floor. Final location shall be coordinated with elevator contractor.
- 47 12. As indicated by elevator contractor, provide a light outlet for each elevator, in center of hoistway.
- 48 13. For signal systems and power operated door: provide ground and branch wiring circuits.
- 49 14. For car light and fan: provide a feeder and branch wiring circuits to elevator control cabinet.
- 50 15. Controller landing wall thickness must be a minimum of 8 inches thick. This is due to the controller
- 51 being mounted on the second floor landing in the door frame on the return side of the door. For
- 52 center opening doors, the controller is located on the right hand frame (from inside the elevator cab
- 53 looking out). These requirements must be coordinated between the general contractor and the
- 54 elevator contractor.
- 55 16. Cutting, patching and recesses to accommodate hall button boxes, signal fixtures, etc.
- 56

- 1 **1.2 SUBMITTALS**
- 2 A. Product data: When requested, the elevator contractor will provide standard cab, entrance and signal
- 3 fixture data to describe product for approval.
- 4 B. Shop drawings:
- 5 1. Show equipment arrangement in the pit and hoistway. Provide plans, elevations, sections and
- 6 details of assembly, erection, anchorage, and equipment location.
- 7 2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other
- 8 pertinent information.
- 9 3. Show floors served, travel distances, maximum loads imposed on the building structure at points of
- 10 support and all similar considerations of the elevator work.
- 11 4. Indicate electrical power requirements and branch circuit protection device recommendations.
- 12 C. Metal Finishes: Provide metal samples
- 13 D. Operation and maintenance data. Include the following:
- 14 1. Owner's Manual and Wiring Diagrams.
- 15 2. Parts list, with recommended parts inventory.
- 16 **1.3 QUALITY ASSURANCE**
- 17 A. Manufacturer Qualifications: An approved manufacturer with minimum fifteen years experience in
- 18 manufacturing, installing, and servicing commercial elevators.
- 19 1. Shall be the manufacturer of the power unit, controller, signal fixtures, door operators cab,
- 20 entrances, and all other major parts of the elevator operating equipment.
- 21 a. The major parts of the elevator equipment shall be manufactured in the United States, and
- 22 not be an assembled system.
- 23 2. The manufacturer shall have a documented, on-going quality assurance program.
- 24 3. ISO-9001:2000 Manufacturer Certified.
- 25 4. ISO-14001:2004 Environmental Management System Certified.
- 26 5. LEED Gold certified elevator manufacturing facility.
- 27 B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than
- 28 fifteen years of satisfactory experience installing elevators equal in character and performance to the
- 29 project elevators.
- 30 C. Regulatory Requirements:
- 31 1. ASME/ANSI A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the
- 32 local building code.
- 33 2. Building Code: National.
- 34 3. NFPA 70 National Electrical Code.
- 35 4. NFPA 80 Fire Doors and Windows.
- 36 5. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- 37 D. Fire-rated Entrance Assemblies: Opening protective assemblies including frames, hardware, and
- 38 operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(B), and NFPA 80. Provide
- 39 entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing
- 40 Laboratory (2 hour label in Canada).
- 41 E. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits
- 42 and fees for elevator installation.
- 43 1. Arrange for inspections and make required tests.
- 44 2. Deliver to the Owner upon completion and acceptance of elevator work.
- 45 F. Product Qualifications:
- 46 1. LCA, EPD and HPD data shall be provided for all major components of the elevator system.
- 47 2. LCA data shall be compatible with GaBI Software.
- 48 3. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis
- 49 having at least a cradle-to-gate scope.
- 50 4. GreenScreen Chemical Hazard Analysis: All ingredients of 100 parts-per-million or greater
- 51 evaluated using GreenScreen for Safer Chemicals Method v1.2.
- 52 5. Health Product Declarations (HPD v2 or later): Complete, published declaration with full disclosure
- 53 of known hazards, prepared using the Health Product Declaration Collaborative's "HPD builder" on-
- 54 line tool; Unknown hazard listed will not be considered acceptable.
- 55 **1.4 DELIVERY, STORAGE AND HANDLING**
- 56 A. Manufacturing will deliver elevator materials, components and equipment and the contractor is responsible
- 57 to provide secure and safe storage on job site.
- 58 **1.5 PROJECT CONDITIONS**

- 1 A. Prohibited Use: Elevators shall not be used for temporary service or for any other purpose during the
2 construction period before Substantial Completion and acceptance by the purchaser unless agreed upon
3 by Elevator Contractor and General Contractor with signed temporary agreement.

4 **1.6 WARRANTY**

- 5 A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace
6 defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or
7 care for 12 months after completion of installation or acceptance thereof by beneficial use, whichever is
8 earlier.

9 **1.7 MAINTENANCE**

- 10 A. Furnish maintenance and call back service for a period of 3 months for each elevator after completion of
11 installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours,
12 excluding callbacks. Service shall consist of periodic examination of the equipment, adjustment,
13 lubrication, cleaning, supplies and parts to keep the elevators in proper operation.
14 1. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of
15 the project site.

16 **PART 2 - PRODUCTS**

17 **2.1 ACCEPTABLE MANUFACTURERS (ELEVATOR-1)**

- 18 A. Manufacturer: ThyssenKrupp Elevator:
19 1. Elevator Model: enduraMRL Above-Ground (1-stage).
20 B. Manufacturer: Otis Elevator Company:
21 1. Elevator Model: Otis Hydrofit.
22 C. System:
23 1. Style: Twinpost, Above Ground, 1-Stage.
24 2. Openings: 2-Sided Front And Rear Aligned.

25 **2.2 MATERIALS, GENERAL**

- 26 A. All Elevator Cab materials including frame, buttons, lighting, wall and ceiling assembly shall have an EPD
27 and an HPD.
28 B. Colors, patterns, and finishes: As selected by the Architect from manufacturer's standard colors, patterns,
29 and finish charts.
30 C. Elevator Finishes:
31 1. Ceiling: Suspended, Stainless Steel.
32 2. Walls: #4 Brushed #304 Stainless Steel.
33 3. Handrails: 2 inches Flat Bar, 2 inches Bumper.
34 4. Floors: "Metal Studded". Stainless steel diamond floor plate. AISI 304, ASTM A793, medium
35 pattern, non-polished finish. 1/8 inch thick.
36 5. Sill: Nickel Silver
37 D. Steel:
38 1. Shapes and bars: Carbon.
39 2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
40 3. Finish: Factory-applied baked enamel for structural parts, powder coat for architectural parts.
41 Color selection shall be based on elevator manufacture's standard selections.
42

1 **2.3 HOISTWAY EQUIPMENT**

- 2 A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood
3 subfloor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated
4 to support one-piece loads weighing up to 25% of the rated capacity.
- 5 B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from
6 the car enclosure.
- 7 C. Guide Rails: Steel, omega shaped, fastened to the building structure with steel brackets.
- 8 1. Guide Shoes: Slide guides shall be mounted on top and bottom of the car.
- 9 2. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on a steel template that is
10 fastened to the pit floor. Provide extensions if required by project conditions.
- 11 3. Jack: Jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack
12 to insure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is
13 prohibited in the jack construction. Provide the following jack type: Twin post holeless. Two jacks
14 piped together, mounted one on each side of the car with a polished steel hydraulic plunger housed
15 in a sealed steel casing having sufficient clearance space to allow for alignment during installation.
16 Each plunger shall have a high pressure sealing system which will not allow for seal movement or
17 displacement during the course of operation. Each Jack Assembly shall have a check valve built
18 into the assembly to allow for automatically re-syncing the two plunger sections by moving the jack
19 to its fully contracted position. The jack shall be designed to be mounted on the pit floor or in a
20 recess in the pit floor. Each jack section shall have a bleeder valve to discharge any air trapped in
21 the section.
- 22 4. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically
23 bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its
24 zone, be automatic and independent of the operating device. The car shall be maintained
25 approximately level with the landing irrespective of its load.
- 26 5. Wiring, Piping, and Oil: Provide all necessary hoistway wiring in accordance with the National
27 Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the
28 power unit to the jack unit. Provide proper grade readily biodegradable oil as specified by the
29 manufacturer of the power unit (see Power Unit section 2.04.G for further details).
- 30 6. Pit moisture/water sensor located approximately 1 foot above the pit floor to be provided. Once
31 activated, elevator will perform "flooded pit operation", which will run the car up to the designated
32 floor, cycle the doors and shut down and trip the circuit breaker shunt to remove 3 phase power
33 from all equipment, including pit equipment.
- 34 7. Motorized oil line shut-off valve shall be provided that can be remotely operated from the controller
35 landing service panel. Also a means for manual operation at the valve in the pit is required.

36 **2.4 POWER UNIT**

- 37 A. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit located in the elevator pit
38 consisting of the following items:
- 39 1. NEMA 4/Sealed Oil reservoir with tank cover including vapor removing tank breather
- 40 2. An oil hydraulic pump.
- 41 3. An electric motor.
- 42 4. Electronic oil control valve with the following components built into single housing; high pressure
43 relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and
44 electro-magnetic controlling solenoids.
- 45 B. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service.
46 Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation.
47 Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.
- 48 C. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating –
49 motors shall be capable of 80 starts per hour with a 30% motor run time during each start.
- 50 D. Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with
51 separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be
52 made without removing the assembly from the oil line.
- 53 1. Relief valve shall be adjustable and be capable of bypassing the total oil flow without increasing
54 back pressure more than 10 percent above that required to barely open the valve.
- 55 2. Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of
56 motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit,
57 ensuring smooth up starts and up stops.
- 58 3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
- 59 4. Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed,
60 leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve

- 1 shall be designed to level the car to the floor in the direction the car is traveling after slowdown is
2 initiated.
- 3 5. Provided with constant speed regulation in both up and down direction. Feature to compensate for
4 load changes, oil temperature, and viscosity changes.
- 5 6. Solid State Starting: Provide an electronic starter featuring adjustable starting currents.
- 6 7. A secondary hydraulic power source (powered by 110VAC single phase) must be provided. This is
7 required to be able to raise (reposition) the elevator in the event of a system component failure (i.e.
8 pump motor, starter, etc.)
- 9 8. Oil Type: Readily biodegradable that is USDA certified biobased product, ultra low toxicity, readily
10 biodegradable, energy efficient, high performing fluid made from canola oil with antioxidant,
11 anticorrosive, antifoaming, and metal-passivating additives. Especially formulated for operating in
12 environmentally sensitive areas. USDA certified biobased product, 95% bio-based content, per
13 ASTM D6866.

14 2.5 HOISTWAY ENTRANCES

- 15 A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening
16 bolted\knock down construction.
- 17 1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger
18 covers, fascia plates, sight guards, and necessary hardware.
- 19 2. Main landing door & frame finish: ASTM A1008 steel panels, factory applied powder coat finish.
- 20 3. Typical door & frame finish: ASTM A 366 steel panels, factory applied powder coat enamel finish.
- 21 B. Integrated Control System: the elevator controller to be mounted to hoistway entrance above first landing.
22 The entrance at this level, shall be designed to accommodate the control system and provide a means of
23 access to critical electrical components and troubleshooting features. See section 2.09 Control System for
24 additional requirements.
- 25 C. At the controller landing, the hoistway entrance frame shall have space to accommodate and provide a
26 lockable means of access (group 2 security) to a 3 phase circuit breaker. See section Miscellaneous
27 Elevator Components for further details.
- 28 D. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code.
29 Provide door restriction devices as required by code.
- 30 E. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each
31 hoistway horizontal sliding door.
- 32 1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
- 33 2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during
34 operation.
- 35 3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.
- 36 F. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

37 2.6 CAR ENCLOSURE

- 38 A. Car Enclosure:
- 39 1. Walls: Reinforced cold-rolled steel with two coats factory applied baked enamel finish.
- 40 2. Canopy: Cold-rolled steel with hinged exit.
- 41 3. Ceiling: Suspended stainless steel type, LED Perimeter-Lit.
- 42 4. Cab Fronts, Return, Transom, Soffit and Strike: Stainless steel.
- 43 5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave
44 type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom
45 by non-metallic sliding guides.
- 46 a. Door Finish: Satin Stainless Steel.
- 47 b. Cab Sills: Extruded aluminum, mill finish.
- 48 6. Handrail: Provide 2 inches flat metal bar on side and rear walls. Handrails shall have a stainless
49 steel, no. 4 brushed finish.
- 50 7. Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.
- 51 B. Car Top Inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency
52 stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal
53 operating devices inoperative. The station will give the inspector complete control of the elevator. The car
54 top inspection station shall be mounted in the door operator assembly.
- 55

1 **2.7 DOOR OPERATION**

- 2 A. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car
3 and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel
4 and the door operating mechanism shall be arranged for manual operation in event of power failure.
5 Doors shall automatically open when the car arrives at the landing and automatically close after an
6 adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor
7 controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled
8 units with oil checks or other deviations are not acceptable.
- 9 1. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or
10 hall call, answering a car or hall call at the present position or selected as a dispatch car.
 - 11 2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no
12 coincident hall call), the current door hold open time is changed to a shorter field programmable
13 time when the electronic door protection device is activated.
 - 14 3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no
15 car calls, and no other hall call assignments, the car door opens to answer the hall call in the
16 direction of the car's current travel. If an onward car call is not registered before the door closes to
17 within 6 inches of fully closed, the travel will reverse and the door will reopen to answer the other
18 call.
 - 19 4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the
20 presence of a passenger or object in the door opening. If door closing is prevented for a field
21 programmable time, a buzzer will sound. When the obstruction is removed, the door will begin to
22 close at reduced speed. If the infra-red door protection system detects a person or object while
23 closing on nudging, the doors will stop and resume closing only after the obstruction has been
24 removed.
 - 25 5. Limited Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors
26 will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
 - 27 6. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time,
28 the doors will recycle closed then attempt to open six times to try and correct the fault.
 - 29 7. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time,
30 the doors will recycle open then attempt to close six times to try and correct the fault.
 - 31 8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door
32 drive motor shall have increased torque applied to possibly overcome mechanical resistance or
33 differential air pressure and allow the door to close.
- 34 B. Door Protection Devices: Provide a door protection system using 150 or more microprocessor controlled
35 infra-red light beams. The beams shall project across the car opening detecting the presence of a
36 passenger or object. If door movement is obstructed, the doors shall immediately reopen.

37 **2.8 CAR OPERATING STATION**

- 38 A. Car Operating Station, General: The main car control in each car shall contain the devices required for
39 specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return
40 shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return
41 and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED's shall be
42 included for each floor served, and emergency buttons and switches shall be provided per code. Switches
43 for car light and accessories shall be provided.
- 44 B. Emergency Communications System: Integral phone system provided.
- 45 C. Keypad Access: Provide door control and operation via a key pad at both rear entrance doors. Key pad will
46 be provided by the City as integral to the city wide Keyscan network.
- 47 D. Signage and Graphics: Comply with handicap/disability requirements. Include notice "in case of fire use
48 stairs".
- 49 E. Auxiliary Operating Panel: Not Required
- 50 F. Column Mounted Car Riding Lantern: Not required.

51 **2.9 CONTROL SYSTEMS**

- 52 A. Controller: Shall be integrated in a hoistway entrance jamb. Should be microprocessor based, software
53 oriented and protected from environmental extremes and excessive vibrations in a NEMA 1 enclosure.
54 Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to
55 correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate
56 landing and "call" push buttons at terminal landings.
- 57 B. Service Panel – to be located outside the hoistway in the controller entrance jamb and shall provide the
58 following functionality/features:
- 59 1. Access to main control board and CPU
 - 60 2. Main controller diagnostics

- 1 3. Main controller fuses
- 2 4. Universal Interface Tool (UIT)
- 3 5. Remote valve adjustment
- 4 6. Electronic motor starter adjustment and diagnostics
- 5 7. Operation of pit motorized shut-off valve with LED feedback to the state of the valve in the pit
- 6 8. Operation of auxiliary pump/motor (secondary hydraulic power source)
- 7 9. Operation of electrical assisted manual lowering
- 8 10. Provide male plug to supply 110VAC into the controller
- 9 11. Run/Stop button
- 10 C. Automatic Light and Fan shut down: The control system shall evaluate the system activity and
- 11 automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be
- 12 field programmable.
- 13 D. Special Operation: Not Applicable
- 14 E. Emergency Power Operation: (Battery Lowering 10-DOC) When the loss of normal power is detected, a
- 15 battery lowering feature is to be activated. The elevator will lower to a predetermined level and open the
- 16 doors. After passengers have exited the car, the doors will close and the car will shut down. When normal
- 17 power becomes available, the elevator will automatically resume operation. The battery lowering feature is
- 18 included in the elevator contract and does not utilize a building-supplied standby power source.

19 2.10 HALL STATIONS

- 20 A. Hall Stations, General: Vandal resistant buttons with halo effect which illuminate to indicate that a call has
- 21 been registered at that floor for the indicated direction. Each button shall be provided with an internal
- 22 automatic stop to prevent damage of switches that register the call. Provide 1 set of pushbutton risers. All
- 23 fixtures shall be vandal resistant type.
- 24 1. Provide one pushbutton riser with faceplates having a satin stainless steel finish.
- 25 2. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station
- 26 at the designated level.
- 27 B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans
- 28 with Disabilities Act (ADA) requirements.
- 29 C. Signage and Graphics: Comply with handicap/disability requirements. Include engraved plate at hall
- 30 station a notice "in case of fire use stairs".
- 31 D. Hall Position Indicator: Not Applicable
- 32 E. Hall lanterns: Not Applicable
- 33 F. Special Equipment: Not Applicable

34 2.11 MISCELLANEOUS ELEVATOR COMPONENTS

- 35 A. Oil Hydraulic Silencer: Install multiple oil hydraulic silencers (muffler device) at the power unit location.
- 36 The silencers shall contain pulsation absorbing material inserted in a blowout proof housing.
- 37 B. Lockable three phase circuit breaker with auxiliary contact with shunt trip capability to be provided. Circuit
- 38 breaker to be located behind locked panel (Group 2 security access) at controller landing entrance jamb
- 39 and should be sized according to the National Electrical Code.
- 40 C. Lockable single phase 110V circuit breaker for cab light and fan to be provided. Circuit breaker to be
- 41 located behind locked panel (Group 2 security access) at controller landing entrance jamb should be sized
- 42 according to the National Electrical Code.

43 PART 3 - EXECUTION

44 3.1 EXAMINATION

- 45 A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and control space, as
- 46 constructed and verify all critical dimensions, and examine supporting structures and all other conditions
- 47 under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory
- 48 conditions have been corrected in a manner acceptable to the installer.
- 49 B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

50 3.2 INSTALLATION

- 51 A. Install elevator systems components and coordinate installation of hoistway wall construction.
- 52 1. Work shall be performed by competent elevator installation personnel in accordance with ASME
- 53 A17.1, manufacturer's installation instructions and approved shop drawings.
- 54 2. Comply with the National Electrical Code for electrical work required during installation.

- 1 B. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to
2 avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure
3 dimensional coordination of the work.
- 4 C. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for
5 accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until
6 car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.
- 7 D. Lubricate operating parts of system where recommended by manufacturer.
- 8 **3.3 FIELD QUALITY CONTROL**
- 9 A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator,
10 perform acceptance tests as required by A17.1 Code and local authorities having jurisdiction. Perform
11 other tests, if any, as required by governing regulations or agencies.
- 12 B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to
13 be performed on the elevator.
- 14 **3.4 ADJUSTING**
- 15 A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly
16 and accurately.
- 17 **3.5 CLEANING**
- 18 A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in
19 accordance with manufacturer's recommendations for type of material and finish provided. Stainless stall
20 shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with
21 bleached-based cleansers.
- 22 B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean
23 equipment rooms and hoistway. Remove trash and debris.
- 24 1. Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners
25 that contain solvents, pine and/or citrus oils are not permitted.
- 26 **3.6 PROTECTION**
- 27 A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective
28 coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from
29 damage or deterioration. Maintain protective measures throughout remainder of construction period.
- 30 **3.7 DEMONSTRATION**
- 31 A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review
32 emergency provisions, including emergency access and procedures to be followed at time of failure in
33 operation and other building emergencies. Train Owner's personnel in normal procedures to be followed
34 in checking for sources of operational failures or malfunctions.
- 35 B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of
36 substantial completion. Determine that control systems and operating devices are functioning properly.
- 37 **3.8 ELEVATOR SCHEDULE (ELEVATOR-1)**
- 38 A. Elevator Qty. 1.
- 39 1. Rated Capacity: 5000 lbs.
- 40 2. Rated Speed: 80 ft./min.
- 41 3. Operation System: TAC32
- 42 4. Travel: Refer to Drawings.
- 43 5. Landings: 2 total.
- 44 6. Openings:
- 45 a. Front: 1.
- 46 b. Rear: 1.
- 47 7. Clear Car Inside: Refer to drawings.
- 48 8. Cab Height: 8'-0" nominal.
- 49 9. Hoistway Entrance Size: 4'-0" wide x 7'-0" high.
- 50 10. Door Type: 4 feet-6 inches Two-Speed, RH, LH.
- 51 11. Opening: Front, Right Hand.
- 52 12. Power Characteristics: 460 volts, 3 Phase, 60 Hz.
- 53 13. Seismic Requirements: Zone 1.
- 54 14. Fixture & Button Style: Vandal Resistant Signal Fixtures.

