William Penn High School Athletic Fields Athletic Field Improvement and Buildings

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Bid Package B

Project Manual Volume 2 of 3

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SECTION 024100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building demolition excluding removal of hazardous materials and toxic substances.

B. Selective demolition of built site elements.

C. Selective demolition of building elements for alteration purposes.

D. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

A. Section 003100 - Available Project Information: Existing building survey conducted by Owner; information about known hazardous materials.

B. Section 011000 - Summary: Limitations on Contractor Manager's use of site and premises.

C. Section 011000 - Summary: Sequencing and staging requirements.

D. Section 011000 - Summary: Description of items to be salvaged or removed for re-use by Contractor Manager.

E. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

F. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

G. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

H. Section 017419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

I. Section 311000 - Site Clearing: Vegetation and existing debris removal; earth stripping and stockpiling.

J. Section 312200 - Grading: Rough and fine grading.

K. Section 312323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

L. Section 329119 - Landscape Grading: Topsoil placement and finish grading.

1.03 DEFINITIONS

A. Demolish: Dismantle, raze, destroy, or wreck any building or structure or any part thereof.

B. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.

C. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.

D. Remove and Reinstall: Detach or dismantle items from existing construction in a manner to prevent damage. Clean and prepare for reuse and reinstall where indicated.

E. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.04 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Site Plan: Indicate:
   1. Vegetation to be protected.
   2. Areas for temporary construction and field offices.
   3. Areas for temporary and permanent placement of removed materials.

C. Demolition Plan: Submit demolition plan as required by OSHA and local AHJs.
   1. Indicate extent of demolition, removal sequencing, bracing and shoring, and location and construction of barricades and fences.
   2. Summary of safety procedures.
   3. Demolition firm qualifications.

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

1.06 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of 10 years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: See Section 312323.

PART 3 EXECUTION

3.01 DEMOLITION

A. Remove the entire building As indicated on drawings.

B. Remove portions of existing buildings as indicated on drawings.

C. Remove paving and curbs required to accomplish new work.

D. Remove all other paving and curbs within site boundaries.

E. Within area of new construction, remove foundation walls and footings to minimum 2 feet (600 mm) below finished grade.

F. Remove concrete slabs on grade within site boundaries.

G. Remove manholes and manhole covers, curb inlets and catch basins.

H. Remove fences and gates.

I. Remove other items indicated, for salvage, relocation, and recycling.

J. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 312200.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with requirements in Section 017000.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.
   4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.

7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
8. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
9. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

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

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

E. Do not begin removal until vegetation to be relocated has been removed and vegetation to remain has been protected from damage.

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

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

H. Hazardous Materials:
1. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCBs, and mercury.

I. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Comply with requirements of Section 017419 - Construction Waste Management and Disposal.
2. Dismantle existing construction and separate materials.
3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

J. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone. Identify and mark, in same manner as other utilities to remain, utilities to be reconnected.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
   1. Verify construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from areas that remain occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.

D. Remove existing work as indicated and required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.
   2. Remove items indicated on drawings.

E. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
   1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. See Section 011000 - Summary for limitations on outages and required notifications.
   4. Verify that abandoned services serve only abandoned facilities before removal.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
   1. Prevent movement of structure. Provide shoring and bracing as required.
   2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch to match new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove materials not to be reused on site; comply with requirements of Section 017419 - Waste Management.

C. Leave site in clean condition, ready for subsequent work.

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

END OF SECTION 024100

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

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 cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.
3. Slabs-on-grade.
4. Suspended slabs.
5. Concrete toppings.
6. Miscellaneous concrete elements, including equipment pads.

B. Related Sections:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.
2. Section 321313 "Concrete Paving" for concrete pavement and walks.
3. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.3 DEFINITIONS

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

1.4 ACTION SUBMITTALS

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

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

E. Field quality-control reports.

F. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. Preinstallation Conference: Conduct conference at Project site.

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

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

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

1.7 DELIVERY, STORAGE, AND HANDLING

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

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

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

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

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better.

b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
c. Structural 1, B-B or better; mill oiled and edge sealed.
d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

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

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

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

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

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

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

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

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

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

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

C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60 (Grade 420) deformed bars, assembled with clips.

D. Plain-Steel Wire: ASTM A 82/A 82M, as drawn or galvanized.

E. Deformed-Steel Wire: ASTM A 496/A 496M.

F. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

G. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

2.3 REINFORCEMENT ACCESSORIES

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

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

B. Tie Wire: Annealed, minimum 16 gage

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II gray. Supplement with the following:

   a. Fly Ash: ASTM C 618, Class F or C.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

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

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

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

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.6 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Carlisle Coatings & Waterproofing, Inc.; Blackline 400.
b. Fortifiber Building Systems Group; Moistop Ultra.
c. Grace Construction Products, W. R. Grace & Co.; Florprufe 120.
d. Insulation Solutions, Inc.; Viper VaporCheck.
e. Meadows, W. R., Inc.; Perminator.
f. Raven Industries Inc.; Vapor Block.
g. Reef Industries, Inc.; Griffolyn.
h. Stego Industries, LLC; Stego Wrap.

2.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

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

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

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

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. BASF Construction Chemicals - Building Systems; Kure 200.
c. ChemMasters; Safe-Cure Clear.
d. Conspec by Dayton Superior; W.B. Resin Cure.
e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
f. Edoco by Dayton Superior; Res X Cure WB.
g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
h. Kaufman Products, Inc.; Thinfilm 420.
i. Lambert Corporation; AQUA KURE - CLEAR.
j. L&M Construction Chemicals, Inc.; L&M Cure R.
k. Meadows, W. R., Inc.; 1100-CLEAR.
l. Nox-Crete Products Group; Resin Cure E.
m. Right Pointe; Clear Water Resin.
n. SpecChem, LLC; Spec Rez Clear.
o. Symons by Dayton Superior; Resi-Chem Clear.
p. TK Products, Division of Sierra Corporation; TK-2519 DC WB.
q. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Anti-Hydro International, Inc.; AH Clear Cure WB.
b. BASF Construction Chemicals - Building Systems; Kure-N-Seal WB.
c. ChemMasters; Safe-Cure & Seal 20.
d. Conspec by Dayton Superior; Cure and Seal WB.
e. Cresset Chemical Company; Crete-Trete 309-VOC Cure & Seal.
f. Dayton Superior Corporation; Safe Cure and Seal (J-18).
g. Edoco by Dayton Superior; Spartan Cote WB II.
h. Euclid Chemical Company (The), an RPM company; Aqua Cure VOX; Clearseal WB 150.
i. Kaufman Products, Inc.; Cure & Seal 309 Emulsion.
j. Lambert Corporation; Glazecote Sealer-20.
k. L&M Construction Chemicals, Inc.; Dress & Seal WB.
l. Meadows, W. R., Inc.; Vocomp-20.
m. Metalcrete Industries; Metcure.
n. Nox-Crete Products Group; Cure & Seal 150E.
o. Symons by Dayton Superior; Cure & Seal 18 Percent E.
p. TK Products, Division of Sierra Corporation; TK-2519 WB.
q. Vexcon Chemicals, Inc.; Starseal 309.

G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

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

H. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. BASF Construction Chemicals - Building Systems; Kure-N-Seal 25 LV.
    b. ChemMasters; Spray-Cure & Seal Plus.
    c. Conspec by Dayton Superior; Sealcure 1315.
    d. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).
    e. Edoco by Dayton Superior; Cureseal 1315.
    f. Euclid Chemical Company (The), an RPM company; Super Diamond Clear; LusterSeal 300.
    g. Kaufman Products, Inc.; Sure Cure 25.
    h. Lambert Corporation; UV Super Seal.
    i. L&M Construction Chemicals, Inc.; Lumiseal Plus.
    j. Meadows, W. R., Inc.; CS-309/30.
    k. Metalcrete Industries; Seal N Kure 30.
    l. Right Pointe; Right Sheen 30.
    m. Vexcon Chemicals, Inc.; Certi-Vex AC 1315.

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

I. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. BASF Construction Chemicals - Building Systems; Kure 1315.
    b. ChemMasters; Polyseal WB.
    c. Conspec by Dayton Superior; Sealcure 1315 WB.
    d. Edoco by Dayton Superior; Cureseal 1315 WB.
    e. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
    f. Kaufman Products, Inc.; Sure Cure 25 Emulsion.

g. Lambert Corporation; UV Safe Seal.
h. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
i. Meadows, W. R., Inc.; Vocomp-30.
j. Metalcrete Industries; Metcure 30.
k. Right Pointe; Right Sheen WB30.
l. Symons by Dayton Superior; Cure & Seal 31 Percent E.
m. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

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

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 or aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.

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

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

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

E. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.9 REPAIR MATERIALS

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

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

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

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

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

B. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

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

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

D. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

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

1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 4 inches (100 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.

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

1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.

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

1. Minimum Compressive Strength: 5000 psi exterior and 4000 psi (27.6 MPa) interior at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm),plus or minus 1 inch (25 mm).
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

D. Suspended Slabs: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Minimum Cementitious Materials Content: 520 lb/cu. yd. (309 kg/cu. m).
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.12 CONCRETE MIXTURE FOR MISCELLANEOUS CONCRETE ELEMENTS

A. Generator Foundation: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4500 psi (27.6 MPa) interior at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm),plus or minus 1 inch (25 mm).
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
6. Form finish with honeycomb filled side surfaces, level float finish top surface.

B. Conduit Duct Bank: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi (27.6 MPa) interior at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm),plus or minus 1 inch (25 mm).
4. Side surfaces cast against earth or forms, level top surface with red pigment.

C. Condensing Unit Pad: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4500 psi (27.6 MPa) interior at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm),plus or minus 1 inch (25 mm).
4. Form finish with honeycomb exposed side surfaces, level broom finish top surface.

D. Interior Housekeeping Pads: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi (27.6 MPa) interior at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm),plus or minus 1 inch (25 mm).
4. Form finish with honeycomb filled side surfaces, hard troweled finish top surface.
5.

2.13 FABRICATING REINFORCEMENT

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

2.14 CONCRETE MIXING

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

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

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

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

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

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

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.

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

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

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

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

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

H. Chamfer exterior corners and edges of permanently exposed concrete.

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

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

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

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

3.4 SHORES AND RESHORES

A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

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

3.5 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.

3.6 STEEL REINFORCEMENT

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

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

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

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

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

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

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

F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.7 JOINTS

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

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

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 CONCRETE PLACEMENT

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

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

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

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

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

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

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

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

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

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

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

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

3.9 FINISHING FORMED SURFACES

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

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

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

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

3.10 FINISHING FLOORS AND SLABS

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

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

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

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated and exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:

a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
b. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated and to where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 6 inches ((150 mm) high unless otherwise indicated; and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4500 psi (31 MPa) at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate.

6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

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

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

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

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

3.15 FIELD QUALITY CONTROL

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

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

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

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

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

E. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 24 hours of finishing.

3.16 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

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SECTION 042000
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete block.
B. Pre-Faced concrete masonry units.
C. Concrete building brick.
D. Clay facing brick.
E. Ceramic glazed face brick.
F. Mortar and grout.
G. Reinforcement and anchorage.
H. Flashings.
I. Lintels.
J. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.
B. Section 055000 - Metal Fabrications: Loose steel lintels.
C. Section 071113 - Bituminous Dampproofing: Dampproofing parged masonry surfaces.
D. Section 072100 - Thermal Insulation: Insulation for cavity spaces.
E. Section 076200 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
F. Section 078400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
G. Section 079200 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2025a.
C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2026.
D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019 (Reapproved 2025).
E. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
F. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2026.
G. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.
H. ASTM C55 - Standard Specification for Dry-Cast Concrete Building Brick; 2025.
I. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2025.
J. ASTM C90 - Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units; 2024a.
K. ASTM C91/C91M - Standard Specification for Masonry Cement; 2025.

L. ASTM C126 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units; 2022.

M. ASTM C129 - Standard Specification for Dry-Cast Nonloadbearing Concrete Masonry Units; 2025.

N. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2026.

O. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2025.

P. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.

Q. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2024.

R. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2024.

S. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2025b.

T. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.

U. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

V. ASTM C744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units; 2021.

W. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2025a.

X. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2024.

Y. ASTM C1405 - Standard Specification for Glazed Brick (Single Fired, Brick Units); 2023.

Z. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015, with Editorial Revision (2022).

AA. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

BB. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.

CC. BIA Technical Notes No. 28B - Brick Veneer/Cold-Formed Steel Framed Walls; 2025.

DD. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

EE. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

FF. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
   1. Include calculations or selections from the manufacturer's prescriptive design tables that indicate compliance with the applicable building code and project conditions.
   2. Include the design engineer's stamp or seal on each sheet of shop drawings.

D. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range.

E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

F. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.

G. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

H. Designer's Qualification Statement.

I. Manufacturer's Qualification Statement.

J. Installer's Qualification Statement.

K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Glazed Units: 50 of each type, size, and color combination.

1.06 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
   1. Maintain one copy of each document on project site.

B. Fire Rated Assemblies: Comply with applicable code for UL (FRD) Assembly No. ____.

C. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

D. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.

E. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. Construct a masonry wall as a mock-up panel sized as indicated on drawings; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.

C. Locate where directed.

D. Mock-up may not remain as part of work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Handle and store ceramic glazed masonry units and pre-faced concrete block units in protective cartons or trays. Do not remove from protective packaging until ready for installation.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depth of 8 inches (200 mm).
   2. Special Shapes: Provide nonstandard blocks configured for corners.
      a. Provide bullnose units for outside corners.
   3. Load-Bearing Units: ASTM C90, normal weight.
      a. Hollow block, as indicated.
      b. Exposed Faces: Manufacturer's standard color and texture where indicated.
   4. Nonloadbearing Units: ASTM C129.
      a. Hollow block, as indicated.
      b. Lightweight.

5. Pre-Faced Units DCMU-1: ASTM C90, hollow block, with smooth, resinous facing complying with ASTM C744.
    a. Colors and styles: As selected by Architect from manufacturer's full range.
    b. Manufacturers:
        1) Echelon, an Oldcastle APG brand: www.echelonmasonry.com/#sle.
        2) Nitterhouse Masonry Products: www.nitterhousemasonry.com/..
        3) Westbrook Concrete Block: www.westbrookblock.com/..
        4) **York Gemstone Ground Face : www.yorkbuilding.com/. (Basis of Design)**
        5) Substitutions: See Section 016000 - Product Requirements.

B. Concrete Brick:
    1. Size: As indicated on drawings.
    2. Concrete Building Brick: ASTM C55; lightweight, solid, for interior or concealed use.

2.02 BRICK UNITS

A. Manufacturers:
    1. Belden Brick: www.beldenbrick.com/#sle.
    2. Endicott Clay Products Co: www.endicott.com/#sle.
    3. General Shale Brick: www.generalshale.com/#sle.
    4. Glen-Gery; : www.glengery.com/
    5. Meridian Brick LLC: www.meridianbrick.com/#sle.
    6. Pacific Clay Products Inc: www.pacificclay.com/#sle.
    7. Watsontown Brick; : www.watsontownbrick.com/.
    8. Yankee Hill Brick Mfg. Co: www.yankeehillbrick.com/#sle.
    9. Substitutions: See section 016000 - Product Requirements.

B. Brick Vaneer BV-1: ASTM C216, Type FBS Smooth, Grade SW.
    1. Color and texture: Watsontown Brick, Atlantic Series, Landover KT Flashed. (Basis of Design)
    2. Modular size: As indicated on drawings.
    3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
        a. SSB-1: Soldier Course Sill, match BV-1.
        b. SSB-2: Row Lock Course Sill, match BV-1.
    4. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

C. Brick Vaneer BV-2: ASTM C1405, Grade S (standard), Type I (single-faced units), Class Exterior, Division Solid.
    1. Color and texture: Glen-Gery White Glazed. (Basis of Design)
    2. Modular size: As indicated on drawings.
    3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn without chipping glaze to produce equivalent effect.

D. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

E. Brick Vaneer BV-3: ASTM C1405, Grade S (standard), Type I (single-faced units), Class Exterior, Division Solid.
    1. Color and texture: Glen-Gery Cardinal Red Glazed. (Basis of Design)
    2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn without chipping glaze to produce equivalent effect.
    3. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

F. Brick Vaneer BV-4: ASTM C216, Type FBS Smooth, Grade SW.
    1. Color and texture: Glen-Gery, Emporium+ Series, Black Pearl Wirecut. (Basis of Design)

2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
3. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

2.03 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91/C91M, Type N.
   1. Colored Mortar: Premixed cement as required to match Architect's color sample.

B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
   1. Not more than 0.60 percent alkali.

C. Hydrated Lime: ASTM C207, Type S.

D. Mortar Aggregate: ASTM C144.

E. Grout Aggregate: ASTM C404.

F. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
   1. Color(s): As selected by Architect from manufacturer's full range.
      a. Minimum 2 colors.

G. Water: Clean and potable.

H. Accelerating Admixture: Nonchloride type for use in cold weather.

I. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.

2.04 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. 3GEN Masonry Products: www.3genmp.com.
   2. Blok-Lok Limited: www.blok-lok.com/#sle.
   3. FERO Corporation: www.ferocorp.com/#sle.
   4. Hohmann & Barnard, Inc: www.h-b.com/#sle.
   5. TruFast Walls, a division of Altenloh, Brinck & Co. US, Inc: www.trufastwalls.com/#sle.
   6. WIRE-BOND: www.wirebond.com/#sle.
   7. Substitutions: See Section 016000 - Product Requirements.

B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa), deformed billet bars; galvanized.

C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Truss or ladder.
   2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
   3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.

E. Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Truss.
   2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
   3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.

F. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Truss, with adjustable ties or tabs spaced at 16 in (406 mm) on center.

2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
3. Size: 0.1875 inch (4.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods and adjustable components of 0.1875 inch (4.8 mm)wire, width of components as required to provide not less than 5/8 inch (16 mm) of mortar coverage from each masonry face.
4. Vertical adjustment: Not more than 1 1/4 inches (32 mm).
5. Seismic Feature: Provide lip, hook, or clip on extended leg of wall ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch (3.8 mm) diameter.
6. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.

G. Strap Anchors: Bent steel shapes, 1-1/2 inch (38 mm) width, 0.105 inch (2.7 mm) thick, 24 inch (610 mm) length, with 1-1/2 inch (38 mm) long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.

H. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch (16 mm) of mortar coverage from masonry face.

I. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
1. Anchor plates: Not less than 0.075 inch (1.91 mm) thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
2. Wire ties: Manufacturer's standard shape, 0.1875 inch (4.75 mm) thick.
3. Vertical adjustment: Not less than 3-1/2 inches (89 mm).

J. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws; corrosion resistant finish or hot dip galvanized to ASTM A153/A153M.

2.05 FLASHINGS

A. Metal Flashing Materials:
1. Stainless Steel Flashing: ASTM A666/A666M, Type 304, soft temper; 26 gauge, 0.0187 inch (0.48 mm) thick; finish 2B to 2D.

B. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
1. Stainless Steel/Polymer Fabric Flashing - Self-adhering: ASTM A240/A240M; 2 mil (0.05 mm) type 304 stainless steel sheet bonded on inward facing side to a sheet of polymer fabric that has a clear adhesive with a removable release liner.

C. Membrane Non-Asphaltic Flashing Materials:
1. Composite Polymer Flashings - Self-Adhering: Composite polyethylene; 40 mil (1.0 mm) thick with pressure-sensitive butyl adhesive and release paper.
2. EPDM Flashing: ASTM D4637/D4637M, Type I, 0.040 inch (1.0 mm) thick.

D. Factory-Fabricated Flashing Corners and End Dams: Stainless steel.

E. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.

F. Termination Bars: Stainless steel; compatible with membrane and adhesives.

G. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.

H. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.06 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

1. Manufacturers:
   a. Blok-Lok Limited: www.blok-lok.com/#sle.
   b. Hohmann & Barnard, Inc: www.h-b.com/#sle.
   c. WIRE-BOND: www.wirebond.com/#sle.
   d. Substitutions: See Section 016000 - Product Requirements.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.

C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.

D. Nailing Strips: Softwood lumber, preservative treated for moisture resistance, dovetail shape, sized to masonry joints.

E. Weeps:
1. Type: Extruded propylene with honeycomb design.
2. Color(s): As selected by Architect from manufacturer's full range.
3. Manufacturers:
   a. Advanced Building Products, Inc: www.advancedbuildingproducts.com/#sle.
   b. Blok-Lok Limited: www.blok-lok.com/#sle.
   c. CavClear, a Division of Archovations Inc: www.cavclear.com/#sle.
   d. Hohmann & Barnard, Inc: www.h-b.com/#sle.
   e. Masonry Technology, Inc: www.mtidry.com/#sle.
   f. Mortar Net Solutions: www.mortarnet.com/#sle.
   g. WIRE-BOND: www.wirebond.com/#sle.
   h. Substitutions: See Section 016000 - Product Requirements.

F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 LINTELS

A. Prefabricated Steel Lintels.

B. Brickwork Support System: Offset steel relief angles or lintels with hanger brackets for support of brickwork above horizontal masonry joints and openings to allow insulation to span continuously behind brick and eliminate continuous thermal bridges associated with support systems that interrupt continuous insulation.

2.08 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
1. Masonry below grade and in contact with earth: Type S.
2. Exterior, loadbearing masonry: Type N.
3. Exterior, non-loadbearing masonry: Type N.
4. Interior, loadbearing masonry: Type N.
5. Interior, non-loadbearing masonry: Type O.

B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

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

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
   3. Mortar Joints: Concave.

D. Brick Units:
   1. Bond: Running , unless indicated otherwise.
   2. Bond: Stacked , BV-4 only.
   3. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
   4. Mortar Joints: Concave.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

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

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

F. Interlock intersections and external corners, except for units laid in stack bond.

G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

J. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

K. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.06 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.07 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions.
   1. Verify that airspace width is no more than 3/8 inch (9 mm) greater than panel thickness.
   2. Hold cavity mortar control panel tight to face wythe.
   3. Install horizontally between joint reinforcement.
   4. Stagger end joints in adjacent rows.
   5. Fit to perimeter construction and penetrations without voids.

D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch (16 mm) mortar cover on each side.

E. Lap joint reinforcement ends minimum 6 inches (150 mm).

F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.

G. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches (38 mm) with at least 5/8 inch (16 mm) mortar cover to the outside face of the anchor.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches (400 mm) on center vertically and 36 inches (900 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches (400 mm) on center vertically and 24 inches (600 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

3.10 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties spaced as indicated on drawings.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

3.11 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up flashing ends at least 1 inch (25.4 mm), minimum, to form watertight pan at nonmasonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Terminate flashing up 8 inches (203 mm) minimum on vertical surface of backing:
   1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.

C. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

D. Support flexible flashings across gaps and openings.

E. Extend plastic, laminated, EPDM, and _____ flashings to within 1/2 inch (12 mm) of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

F. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

3.12 LINTELS

A. Install loose steel lintels over openings.

B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
   1. Openings to 42 inches (1070 mm): Place two, No. 3 (M9) reinforcing bars 1 inch (25 mm) from bottom web.
   2. Openings from 42 inches (1070 mm) to 78 inches (1980 mm): Place two, No. 5 (M16) reinforcing bars 1 inch (25 mm) from bottom web.
   3. Openings over 78 inches (1980 mm): Reinforce openings as detailed.
   4. Do not splice reinforcing bars.
   5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
   6. Place and consolidate grout fill without displacing reinforcing.
   7. Allow masonry lintels to attain specified strength before removing temporary supports.

C. Maintain minimum 8 inch (203.2 mm) bearing on each side of opening.

D. Install thermal brick support system in accordance with manufacturer’s instructions at locations indicated on drawings

3.13 GROUTED COMPONENTS

A. Reinforce bond beams as indicated on drawings.

B. Lap splices minimum 24 bar diameters.

C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

D. Place and consolidate grout fill without displacing reinforcing.

E. At bearing locations, fill masonry cores with grout for a minimum 12 inches (300 mm) either side of opening.

3.14 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Size control joints as indicated on drawings; if not indicated, 3/4 inch (19 mm) wide and deep.

D. Form expansion joint as detailed on drawings.

3.15 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.16 TOLERANCES

A. Install masonry within the site tolerances found in TMS 402/602.

B. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).

C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.

E. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.

F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).

G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).

H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

3.17 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.18 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.19 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.20 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION 042000

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SECTION 047200
CAST STONE MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural cast stone.

1.02 RELATED REQUIREMENTS

A. Section 040511 - Masonry Mortaring and Grouting: Mortar for setting cast stone.

B. Section 042000 - Unit Masonry: Installation of cast stone in conjunction with masonry.

C. Section 079200 - Joint Sealants: Sealing joints indicated to be left open for sealant.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code for Structural Concrete—Code Requirements and Commentary; 2025.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2026.

C. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2022.

D. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2025.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.

F. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2024a.

G. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.

H. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2025b.

I. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2024.

J. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2025.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Test results of cast stone components made previously by the manufacturer.
   1. Include one copy of ASTM C1364 for Architect's use.

C. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.

D. Mortar Color Selection Samples.

E. Verification Samples: Pieces of actual cast stone components not less than 6 inches (152 mm) square, illustrating range of color and texture to be anticipated in components furnished for the project.

F. Source Quality Control Test Reports.

G. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. A firm with a minimum of 5 years experience producing cast stone of types required for project.
   2. Current producer member of the Cast Stone Institute or the Architectural Precast Association.

3. Manufacturer's production facility currently holds a Plant Certification from the Cast Stone Institute or the Architectural Precast Association.
4. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.

B. Number each piece individually to match shop drawings and schedule.

C. Store cast stone components and installation materials in accordance with manufacturer's instructions.

D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.

E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.

F. Store mortar materials where contamination can be avoided.

G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Architectural Cast Stone:
1. Any current producer member of the Architectural Precast Association.

2.02 ARCHITECTURAL CAST STONE

A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural limestone, complying with ASTM C1364.
1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
2. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet (6 meters).
4. Color: Selected by Architect from manufacturer's full range.
5. Remove cement film from exposed surfaces before packaging for shipment.

B. Shapes: Provide shapes and size as indicated on drawings.
1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch (3 mm) or length divided by 360, whichever is greater, but not more than 1/4 inch (6 mm).
2. Unless otherwise indicated on drawings, provide:
a. Wash or slope of 1:12 on exterior horizontal surfaces.
b. Drips on projecting components, wherever possible.
c. Raised fillets at back of sills and at ends to be built in.

C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI CODE-318.

2.03 MATERIALS

A. Portland Cement: ASTM C150/C150M.
1. For Units: Type I or II, white.
2. For Mortar: Type I or II, except Type III may be used in cold weather.

B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.

C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.

D. Admixtures: ASTM C494/C494M.

E. Water: Potable.

F. Reinforcing Bars: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa), deformed bars, epoxy coated.
   1. Epoxy coated in accordance with ASTM A775/A775M.

G. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.

H. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.

I. Mortar: Portland cement-lime, as specified in Section 040511 ; do not use masonry cement.

J. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.

B. Do not begin installation until unacceptable conditions have been corrected.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cast stone components in conjunction with masonry, complying with requirements of Section 042000.

C. Mechanically anchor cast stone units indicated; set remainder in mortar.

D. Setting:
   1. Drench cast stone components with clear, running water immediately before installation.
   2. Set units in a full bed of mortar unless otherwise indicated.
   3. Fill vertical joints with mortar.
   4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

3.03 TOLERANCES

A. Joints: Make all joints 3/8 inch (9.5 mm), except as otherwise detailed.
   1. Rake mortar joints 3/4 inch (19 mm) for pointing.
   2. Remove excess mortar from face of stone before pointing joints.
   3. Point joints with mortar in layers 3/8 inch (9.5 mm) thick and tool to a slight concave profile.
   4. Leave the following joints open for sealant:
      a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
      b. Joints in projecting units.
      c. Joints between rigidly anchored units, including soffits, panels, and column covers.
      d. Joints below lugged sills and stair treads.
      e. Joints below ledge and relieving angles.
      f. Joints labeled "expansion joint".

B. Installation Tolerances:
   1. Variation from Plumb: Not more than 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.

2. Variation from Level: Not more than 1/8 inch in 10 feet (3 mm in 3 m) or 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.
3. Variation in Joint Width: Not more than 1/8 inch in 36 inches (3 mm in 900 mm) or 1/4 of nominal joint width, whichever is less.
4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch (1.5 mm) difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.04 REPAIR

A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet (6 m).

B. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.

C. Repair methods and results subject to Architect 's approval.

3.05 CLEANING

A. Clean completed exposed cast stone after mortar is thoroughly set and cured.
   1. Wet surfaces with water before applying cleaner.
   2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
   3. Remove cleaner promptly by rinsing thoroughly with clear water.
   4. Do not use acidic cleaners.

B. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

3.06 PROTECTION

A. Protect completed work from damage.

B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

END OF SECTION 047200

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

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. Structural steel.
2. Field-installed shear connectors.
3. Grout.

B. Related Requirements:
1. Section 055000 "Metal Fabrications" for miscellaneous steel fabrications and other steel items not defined as structural steel.

1.3 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.

C. Heavy Sections: Rolled and built-up sections as follows:

1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches (38 mm).
2. Welded built-up members with plates thicker than 2 inches (50 mm).
3. Column base plates thicker than 2 inches (50 mm).

D. Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.

E. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Demand Critical" or "Seismic Critical" on Drawings.

1.4 COORDINATION

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

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

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Identify members and connections of the Seismic-Load-Resisting System.
6. Indicate locations and dimensions of protected zones.
7. Identify demand critical welds.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

D. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

C. Mill test reports for structural steel, including chemical and physical properties.

D. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.

6. Nonshrink grout.

E. Survey of existing conditions.

F. Source quality-control reports.

G. Field quality-control and special inspection reports.

1.8 QUALITY ASSURANCE

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

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

B. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.9 DELIVERY, STORAGE, AND HANDLING

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

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

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

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC 360.
2. Use Allowable Stress Design; data are given at service-load level.

B. Moment Connections: Type PR, partially restrained.

C. Construction: Combined system of moment frame and shear walls.

2.2 STRUCTURAL-STEEL MATERIALS

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

B. W-Shapes: ASTM A 992/A 992M, Grade 50 (345).

C. Channels, Angles: ASTM A 36/A 36M.

D. Plate and Bar: ASTM A 36/A 36M.

E. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588/A 588M, Grade 50 (345).

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

G. Corrosion-Resisting, Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.

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

1. Weight Class: See drawings.
2. Finish: See drawings.

I. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.

B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain.

C. Headed Anchor Rods: ASTM F 1554, Grade 36 straight.

1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
4. Finish: Plain or Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

D. Threaded Rods: ASTM A 36/A 36M.

1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.

2. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened.
3. Finish: Plain or Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

2.4 PRIMER

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 unless indicated to be finish painted.

C. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.5 GROUT

A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

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

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

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

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

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning.", SSPC-SP 2, "Hand Tool Cleaning." Or SSPC-SP 3, "Power Tool Cleaning."

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

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

2.7 SHOP CONNECTIONS

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

1. Joint Type: Snug tightened unless noted otherwise on drawing.

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

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

2.8 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.

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

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
5. SSPC-SP 14/NACE No. 8, "Industrial Blast Cleaning."
6. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
7. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
8. SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning."
9. SSPC-SP 8, "Pickling."

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

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

D. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

2.9 GALVANIZING

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

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels, shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.10 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

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

B. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

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

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

1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

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

3.2 PREPARATION

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

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

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

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

3.4 FIELD CONNECTIONS

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

1. Joint Type: Snug tightened unless otherwise noted on drawing.

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

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

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Bolted Connections: Inspect[and test] bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

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

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

3.6 REPAIRS AND PROTECTION

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

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

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

C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

D. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

END OF SECTION 05 12 00

SECTION 05 21 00 - STEEL JOIST FRAMING

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. K-series steel joists.
2. KCS-type K-series steel joists.
3. K-series steel joist substitutes.
4. Joist accessories.

B. Related Requirements:
1. Section 042000 "Unit Masonry" for installing bearing plates in unit masonry.

1.3 DEFINITIONS

A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.4 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
3. Indicate locations and details of bearing plates to be embedded in other construction.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Welding certificates.

C. Manufacturer certificates.

D. Mill Certificates: For each type of bolt.

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications".

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications".

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.8 SEQUENCING

A. Deliver steel bearing plates to be built into masonry construction.

PART 2 - PRODUCTS

2.1 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

1. Joist Type: K-series steel joists and KCS-type K-series steel joists.

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

C. Provide holes in chord members for connecting and securing other construction to joists.

D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."

E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."

F. Camber joists according to SJI's "Specifications."

G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches (1:48).

2.2 PRIMERS

A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.3 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Fabricate steel bearing plates from ASTM A 36/A 36M steel with integral anchorages of sizes and thicknesses indicated. Hot-dip zinc coat according to ASTM A 123/A 123M.

C. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface unless otherwise indicated.

1. Finish: Plain, uncoated.

D. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

1. Finish: Plain.

E. Welding Electrodes: Comply with AWS standards.

F. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.4 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.

B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.

C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil (0.025 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing 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. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications" joist manufacturer's written instructions, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.

C. Field weld joists to supporting steel and bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts.

E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Visually inspect field welds according to AWS D1.1/D1.1M.

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

a. Liquid Penetrant Inspection: ASTM E 165/E 165M.
b. Magnetic Particle Inspection: ASTM E 709.
c. Ultrasonic Testing: ASTM E 164.
d. Radiographic Testing: ASTM E 94.

C. Visually inspect bolted connections.

D. Prepare test and inspection reports.

3.4 PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.

1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2 or power-tool cleaning according to SSPC-SP 3.
2. Apply a compatible primer of same type as primer used on adjacent surfaces.

END OF SECTION 05 21 00

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SECTION 05 31 00 - STEEL DECKING

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 deck.
2. Composite floor deck.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
2. Section 051200 "Structural Steel Framing" for shop- and field-welded shear connectors.
3. Section 055000 "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated, including self-drilling screws.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

2. Include data on self-drilling screws and spacing to comply with design loads/criteria.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of steel deck.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

1. Power-actuated mechanical fasteners.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

C. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

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

D. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 ROOF DECK

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ASC Profiles, Inc.; a Blue Scope Steel company.
2. Canam United States; Canam Group Inc.
3. CMC Joist & Deck.
4. Consolidated Systems, Inc.; Metal Dek Group.
5. Cordeck.
6. DACS, Inc.
7. Epic Metals Corporation.
8. Marlyn Steel Decks, Inc.
9. New Millennium Building Systems, LLC.
10. Nucor Corp.; Vulcraft Group.

11. Roof Deck, Inc.
12. Valley Joist; Subsidiary of EBSCO Industries, Inc.
13. Verco Manufacturing Co.
14. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40 (275), G60 (Z180) zinc coating.
2. Deck Profile: As indicated.
3. Profile Depth: As indicated.
4. Design Uncoated-Steel Thickness: As indicated.
5. Span Condition: Triple span or more.
6. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.3 COMPOSITE FLOOR DECK

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ASC Profiles, Inc.; a Blue Scope Steel company.
2. Canam United States; Canam Group Inc.
3. CMC Joist & Deck.
4. Consolidated Systems, Inc.; Metal Dek Group.
5. Cordeck.
6. DACS, Inc.
7. Epic Metals Corporation.
8. Marlyn Steel Decks, Inc.
9. New Millennium Building Systems, LLC.
10. Nucor Corp.; Vulcraft Group.
11. Roof Deck, Inc.
12. Verco Manufacturing Co.
13. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

B. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:

1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40 (275), G60 (Z180) zinc coating.
2. Profile Depth: As indicated.
3. Design Uncoated-Steel Thickness: As indicated on drawings.
4. Span Condition: Triple span or more unless noted otherwise.

2.4 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws. Use self-drilling screws for roof deck on cold-formed trusses.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.

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

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile indicated and if not indicated recommended by SDI Publication No. 31 for overhang and slab depth.

G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.

H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.

I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0747 inch (1.90 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.

J. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.

K. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and sloped recessed pans of 1-1/2-inch (38-mm) minimum depth. For drains, cut holes in the field.

L. Galvanizing Repair Paint: ASTM A 780, SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

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

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches (38 mm) long, and as follows:

1. Weld Diameter: 5/8 inch (16 mm) nominal.
2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches (305 mm) apart in the field of roof and 6 inches (150 mm) apart in roof corners and perimeter, based on roof-area definitions in FMG Loss Prevention Data Sheet 1-28.
3. Weld Washers: Install weld washers at each weld location as required.
4. For cold-formed trusses use #12 self-drilling Tek screws.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 18 inches (457 mm) and as follows:

1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:

1. End Joint: Lapped 2 inches (51 mm) minimum or butted at Contractor's option.

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches (305 mm) apart with at least one fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten.

E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.4 FLOOR-DECK INSTALLATION

A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:

1. Weld Diameter: 5/8 inch (16 mm)nominal.
2. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches (305 mm) apart, but not more than 18 inches (457 mm) apart.
3. Weld Spacing: Space and locate welds as indicated.
4. Weld Washers: Install weld washers at each weld location.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches (914 mm), and as follows:

1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.
2. Mechanically clinch or button punch.
3. Fasten with a minimum of 1-1/2-inch- (38-mm-) long welds.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:

1. End Joints: Lapped or butted at Contractor's option.

D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.

E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

F. Install piercing hanger tabs at 14 inches (355 mm) apart in both directions, within 9 inches (228 mm) of walls at ends, and not more than 12 inches (305 mm) from walls at sides unless otherwise indicated.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

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

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

C. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

D. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 31 00

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SECTION 05 40 00 - COLD-FORMED METAL FRAMING

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. Exterior non-load-bearing wall framing.
2. Ceiling joist framing.
3. Soffit framing.
4. All members indicated on drawings as "Cold-Formed" and/or 20 gauge or heavier.
5. Engineered design, calculations and shop drawings signed and sealed by a Delaware Professional Engineer.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for masonry shelf angles and connections.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies.
3. Section 092216 "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

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

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: For cold-formed steel framing. Provide Engineered design calculations and shop drawings signed and sealed by an engineer licensed in the State of Delaware.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
   1. Expansion anchors.
   2. Power-actuated anchors.
   3. Mechanical fasteners.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

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

   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

D. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data bay a qualified professional engineer

E. Professional Engineer Qualifications: A Professional Engineer who is legally qualified to practice in jurisdiction where project is located (State of Delaware) and who is experience in providing engineering services of the kind indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   1. AllSteel & Gypsum Products, Inc.
   2. California Expanded Metal Products Company.
   3. ClarkWestern Building Systems, Inc.
   4. Consolidated Fabricators Corp.; Building Products Division.
   5. Craco Mfg., Inc.
   6. Custom Stud Inc.
   7. Design Shapes in Steel.
   8. Dietrich Metal Framing; a Worthington Industries Company.
   9. Formetal Co. Inc. (The).

10. MarinoWARE.
11. Nuconsteel; a Nucor Company.
12. Olmar Supply, Inc.
13. Quail Run Building Materials, Inc.
14. SCAFCO Corporation.
15. Southeastern Stud & Components, Inc.
16. State Building Products, Inc.
17. Steel Construction Systems.
18. Steel Network, Inc. (The).
19. Steel Structural Systems.
20. Steeler, Inc.
21. Super Stud Building Products, Inc.
22. Telling Industries, LLC.
23. United Metal Products, Inc.
24. United Steel Manufacturing.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified Delaware professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated.
2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

    a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of the wall height.
    b. Ceiling Joist Framing: Vertical deflection of 1/360 of the span for live loads and 1/240 for total loads of the span.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

    a. Upward and downward movement of 1 inch (25 mm).

5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

C. Cold-Formed Steel Framing Design Standards:

1. Wall Studs: AISI S211.
2. Headers: AISI S212.

D. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

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

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

1. Grade: As required by structural performance.
2. Coating: G60 (Z180).

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

1. Grade: 33 (230) or 50 (340), Class 1.
2. Coating: G60 (Z180).

2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: See drawings.
2. Minimum Flange Width: See drawings.
3. Minimum Section Properties: See drawings.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Flange Width: 1-1/4 inches (32 mm).

C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. AllSteel & Gypsum Products, Inc.
b. ClarkWestern Building Systems, Inc.
c. Dietrich Metal Framing; a Worthington Industries company.
d. MarinoWARE.
e. SCAFCO Corporation.
f. Steel Network, Inc. (The).
g. Steeler, Inc.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: As required by design (18 gauge minimum), or as indicated.
2. Flange Width: 1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications.

E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

a. Minimum Base-Metal Thickness: As required by design (18 gauge minimum).
b. Flange Width: 1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications.

2. Inner Track: Of web depth indicated, and as follows:

a. Minimum Base-Metal Thickness: As required by design (18 gauge minimum).
b. Flange Width: 1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications.

F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.5 CEILING JOIST FRAMING

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As required or indicated.
2. Flange Width: 1-5/8 inches (41 mm) minimum.

2.6 SOFFIT FRAMING

A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As required or indicated.
2. Flange Width: 1-5/8 inches (41 mm), minimum.

2.7 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.8 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.9 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.

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

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.10 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.

4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below

that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

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

3.3 INSTALLATION, GENERAL

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

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

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

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

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

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

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

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

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

H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

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

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

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

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

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

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

1. Stud Spacing: 16 inches (406 mm) unless noted otherwise.

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

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.
4. Connect drift clips to cold-formed metal framing and anchor to building structure.

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

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

a. Install solid blocking at centers indicated on Shop Drawings.

2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

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

3.5 CEILING JOIST AND SOFFIT INSTALLATION

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.

C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:

1. Joist spacing: 16 inches (406 mm) or as indicated.

D. Frame openings with built-up joist headers consisting of joist and joist track, or another combination of connected joists if indicated.

E. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:

1. Bridging: Joist –track solid blocking of width and thickness indicated, secured to joist webs.

2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.

F. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

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

3.6 FIELD QUALITY CONTROL

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

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

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

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

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

3.7 REPAIRS AND PROTECTION

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

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

END OF SECTION 05 40 00

SECTION 05 44 00 - COLD-FORMED METAL TRUSSES

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. Cold-formed steel trusses for roofs.

2. Engineered design calculations and shop drawings signed and sealed by an engineer licensed in the State of Delaware.

B. Related Requirements:

1. Section 054000 "Cold-Formed Metal Framing" for cold-formed steel studs, joists, and rafters.

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. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel trusses; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
3. Include structural analysis data signed and sealed by the qualified professional engineer licensed in the State of Delaware responsible for their preparation.

C. Delegated-Design Submittal: For cold-formed steel trusses. Provide Engineered design calculations and shop drawings signed and sealed by an engineer licensed in the State of Delaware.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Miscellaneous structural clips and accessories.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

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

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

D. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

E. Professional Engineer Qualifications: A Professional Engineer who is legally qualified to practice in jurisdiction where project is located (State of Delaware) and who is experienced in providing engineering services of the kind indicated.

F. Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standards for Cold-Formed Steel Framing – General Provisions", and "Truss Design" and "Header Design".

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

H. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, ductility, and metallic-coating thickness.

I. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jursidiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed steel trusses from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. All-Span Incorporated.
2. Aegis Metal Framing.
3. Genesis Worldwide Inc.
4. Marino/WARE.
5. Nuconsteel, A Nucor Company.
6. Steel Construction Systems.
7. TrusSteel; an ITW company.
8. USA Frametek.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer licensed in the State of Delaware to design cold-formed steel trusses.

B. Structural Performance: Provide cold-formed steel trusses capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated on drawings, Engineer to calculate code required drifting and sliding snow.
2. Deflection Limits: Design trusses to withstand design loads without deflections greater than the following:

   a. Roof Trusses: As indicated on drawings.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.

C. Cold-Formed Steel Framing Design Standards:

1. Lateral Design: Design according to AISI S213.
2. Roof Trusses: Design according to AISI S214.

D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL TRUSS MATERIALS

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

B. Steel Sheet: ASTM A 1003, structural grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: ST33H or as required by structural performance.
2. Coating: G60.

2.4 ROOF TRUSSES

A. Roof Truss Members: Manufacturer's standard C-shaped steel sections.

1. Connecting Flange Width: 1-5/8 inches minimum at top and bottom chords connecting to sheathing or other directly fastened construction.
2. Minimum Base-Metal Thickness: 0.0329 inch.

2.5 ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003, structural grade, Type H, metallic coated, of same grade and coating weight used for truss members.

B. Provide accessories of manufacturer's standard thickness and configuration unless otherwise indicated.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and Appendix D in ACI 318, greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Fasteners: Fastener system of type suitable for application, fabricated from corrosion-resistant materials, with capability to sustain, without failure, allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B , VOC compliant.

B. Shims: Load bearing, of high-density multimonomer plastic, nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

2.8 FABRICATION

A. Fabricate cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate trusses using jigs or templates.
2. Cut truss members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel truss members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator.

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

4. Fasten other materials to cold-formed steel trusses by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace trusses to withstand handling, delivery, and erection stresses. Lift fabricated trusses to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

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

2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting cold-formed steel trusses 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 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed steel trusses without reducing thickness of fire-resistive materials below that is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION

A. Install, bridge, and brace cold-formed steel trusses according to AISI S200, AISI S214, AISI's "Code of Standard Practice for Cold-Formed Steel Structural Framing," and manufacturer's written instructions unless more stringent requirements are indicated.

B. Install cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened.

1. Fasten cold-formed steel trusses by welding or mechanical fasteners.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings; comply with requirements for spacing, edge distances, and screw penetration.

C. Install temporary bracing and supports. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

D. Truss Spacing: As indicated.

E. Do not alter, cut, or remove framing members or connections of trusses.

F. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.

G. Erect trusses without damaging framing members or connections.

H. Coordinate with wall framing to align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.

I. Install continuous bridging and permanently brace trusses as indicated on Shop Drawings and designed according to CFSEI's TechNote 551e, "Design Guide: Permanent Bracing of Cold-Formed Steel Trusses.".

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

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

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

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

C. Prepare test and inspection reports.

3.5 REPAIRS AND PROTECTION

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

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

END OF SECTION 05 44 00

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SECTION 055000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel and aluminum items.

B. Downspout boots.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 042000 - Unit Masonry: Placement of metal fabrications in masonry.

C. Section 042613 - Masonry Veneer: Placement of metal fabrications in masonry.

D. Section 051200 - Structural Steel Framing: Structural steel column anchor bolts.

E. Section 052100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.

F. Section 053100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.

G. Section 055133 - Metal Ladders.

H. Section 055213 - Pipe and Tube Railings.

I. Section 077123 - Manufactured Gutters and Downspouts: Downspout boots.

J. Section 099000 - Painting and Coating

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2022.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

F. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2025.

G. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.

H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

I. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

J. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2021.

K. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

L. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.

M. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2025.

N. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings; 2025.

O. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

P. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.

Q. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2023.

R. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

S. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

T. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

U. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

V. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

W. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019, with Editorial Revision (2025).

X. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

Y. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

Z. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
      a. Include the following, as applicable:
         1) Design criteria.
         2) Engineering analysis depicting stresses and deflections.
         3) Member sizes and gauges.
         4) Details of connections.
         5) Support reactions.
         6) Bracing requirements.

C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

D. Designer's Qualification Statement.

E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE

A. Design metal fabricated items under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Stainless Steel, General: ASTM A666/A666M, Type 304.

F. Stainless Steel Tubing: ASTM A554, Type 304, 16 gauge, 0.0625 inch (1.59 mm) minimum metal thickness, 1-1/2 inch (38 mm) diameter.

G. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.

H. Slotted Channel Fittings: ASTM A1011/A1011M.

I. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.

J. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

L. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

M. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.

C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.

D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.

E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.

F. Aluminum-Alloy Die Castings: ASTM B85/B85M.

G. Bolts, Nuts, and Washers: Stainless steel.

H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

C. Lintels: As detailed; prime paint finish.

D. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.

2.05 DOWNSPOUT BOOTS

A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots and on-body cleanout and cover with neoprene gaskets.
   1. Configuration: Angular.

2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
3. Finish: Manufacturer's standard factory applied powder coat finish.
4. Color: To be selected by Architect from manufacturer's full range.
5. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, and rubber coupling.

2.06 FINISHES - STEEL

A. Prime paint steel items.
1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating. (Provide minimum 530 g/sq m galvanized coating.)

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

G. Stainless Steel Finish: No. 4 Bright Polished finish.

2.07 FINISHES - ALUMINUM

A. Fluoroethylene Vinyl Ether (FEVE) Coating: Superior performing resin based organic powder coatings system complying with AAMA 2605; single coat applications when applied to aluminum with dry film thickness (DFT) of 2 to 3 mil, 0.002 to 0.003 inch (0.051 to 0.076 mm); color and gloss as scheduled.
1. Apply coating to exposed metal surfaces with proper preparation and pretreatment in accordance with resin manufacturer's instructions.

B. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.08 FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

G. Hidden Access Panels:
   1. Mount panel frame on mortar bed at indicated elevation, plumb and level.
   2. Infill panel cover with paver units following layout pattern without disruptions.
   3. Place panel cover in panel frame securely.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION 055000

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SECTION 055133
METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop-fabricated metal ladders.

1.02 RELATED REQUIREMENTS

A. Section 055213 - Pipe and Tube Railings.

B. Section 099000 - Painting and Coating.

1.03 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008 (Reaffirmed 2018).

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.

E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

H. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

J. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

K. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019, with Editorial Revision (2025).

L. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

M. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

N. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

D. Designer's Qualification Statement.

E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

F. Specimen warranty.

G. Executed warranty.

1.05 QUALITY ASSURANCE

A. Design metal ladders under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 5-year manufacturer warranty for material and workmanship. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

F. Bolts, Nuts, and Washers: ASTM A307, plain.

G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED LADDERS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
   1. Side Rails: 3/8 by 2 inches (9 by 50 mm) members spaced at 20 inches (500 mm).
   2. Rungs: One inch (25 mm) diameter solid round bar spaced 12 inches (300 mm) on center.
   3. Space rungs 7 inches (175 mm) from wall surface.

2.04 FINISHES - STEEL

A. Prime paint steel items.

1. Do not prime surfaces in direct contact with concrete.
2. Do not prime surfaces where field welding is required.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION 055133

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SECTION 061053
MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTIONS INCLUDES

A. Preservative-treated wood materials.
B. Fire-retardant-treated wood materials.
C. Communications and electrical room mounting boards.
D. Wood in contact with membrane roofing.
E. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

A. Section 077100 - Roof Specialties
B. Section 077200 - Roof Accessories
C. Section 081113 - Hollow Metal Doors and Frames
D. Section 083100 - Access Doors and Panels
E. Section 087100 - Door Hardware
F. Section 092116 - Gypsum Board Assemblies
G. Section 101200 - Display Cases
H. Section 102239 - Folding Panel Partitions.
I. Section 102600 - Wall and Door Protection
J. Section 104400 - Fire Protection Specialties
K. Section 123600 - Countertops
L. Section 076200 - Sheet Metal Flashing and Trim.

1.03 REFERENCE STANDARDS

A. APA E30 - Engineered Wood Construction Guide; 2019.
B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
C. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel; 2021.
D. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2024).
E. ASTM E518/E518M - Standard Test Methods for Flexural Bond Strength of Masonry; 2022.
F. AWPA M4 - Standard for the Handling, Storage, Field Fabrication and Field Treatment of Preservative-Treated Wood Products; 2023.
G. AWPA U1 - Use Category System: User Specification for Treated Wood; 2025.
H. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
I. ITS (DIR) - Directory of Listed Products; Current Edition.
J. PS 1 - Structural Plywood; 2023.
K. PS 20 - American Softwood Lumber Standard; 2025.
L. SPIB (GR) - Standard Grading Rules; 2021.
M. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Fire-retardant treatment.
   2. Pressure-preservative treatment.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Cover wood products to protect against moisture. Support stacked products to prevent deformation and allow air circulation.

B. Fire-Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org), and that provides grading service for species and grade specified. Provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER

A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No.2 or Standard Grade.
   2. Boards: Standard or No.3.

E. Window and Door Bucks: 1-1/2 inch (38 mm) thick laminated strand lumber.
   1. Comply with AWPA U1 use category 2.
   2. R-Value: 1.86 when tested in accordance with ASTM E518/E518M.

F. Parapet Caps: 1-1/2 inch (38 mm) thick, laminated strand lumber.
   1. Comply with AWPA U1 use category 2.
   2. R-Value: 1.86 when tested in accordance with ASTM E518/E518M.

2.03 CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: PS 1, A-D plywood; 3/4 inch (19 mm) thick; fire-retardant treated.

B. Plywood Concealed from View but Located Within Exterior Enclosure: PS 1, C-C Plugged or better, exterior grade.

C. Other Locations: PS 1, C-D Plugged or better.

2.04 FIRE-RETARDANT TREATMENT (FRT)

A. Factory-treat wood members in accordance with AWPA U1 and use category indicated.

B. Fire-Retardant Treatment: Interior Type A, Use Category UCFA (LT), Low-Temperature (low hygroscopic).
   1. Treat blocking and other wood members concealed in noncombustible construction.
   2. Treat electrical and communications panel backer boards.

C. Fire-Retardant Treatment: Interior Type A, Use Category UCFA (HT), High Temperature.
   1. Treat blocking and other wood members concealed in noncombustible construction.
   2. Treat electrical and communications panel backer boards.
   3. Treat wood and plywood used in roof framing and attic spaces.

D. Fire-Retardant Treatment: Exterior Type B, Use Category UCFB.
   1. Treat blocking and other wood members concealed in noncombustible construction.

E. Kiln-dry after treatment (KDAT) to maximum moisture content of 19 percent for sawn material and 15 percent for plywood.

F. Fabrication of FRT Wood:
   1. Ripping or milling of boards, lumber, and timber after treatment is not permitted.
   2. Field cutting to length and drilling of holes in boards, lumber, and timber are permitted without additional treatment.
   3. Field cutting and drilling of holes in plywood are permitted.

G. Label or brand FRT wood with classification mark of UL (DIR) or ITS (DIR) or other approved inspection agency, the treatment plant, name of treatment, species of wood, flame spread and smoke-developed indexes, method of drying after treatment, and treating standard.
   1. In addition, Exterior Type B labeling shall include the words: NO INCREASE IN THE LISTED CLASSIFICATION WHEN SUBJECTED TO THE STANDARD RAIN TEST (ASTM D2898).

2.05 PRESSURE-PRESERVATIVE TREATMENT (PPT)

A. Factory-treat wood members in accordance with AWPA U1 and use category indicated.

B. Applications - Treat the Following:
   1. Wood framing in contact with exterior foundation walls where member is less than 8 inches (200 mm) from exposed earth: Use Category UC2, above ground, interior, damp.
   2. Wood framing members in direct contact with interior of exterior masonry or concrete walls below grade: Use Category UC1, above ground, interior, dry.
   3. Lumber and plywood in contact with membrane roofing and flashing: Use Category UC3B, above ground, exterior.

C. Kiln-dry wood after treatment with waterborne preservative to maximum moisture content of 19 percent for lumber and 15 percent for plywood.

D. Perform fabrication such as cutting, boring, milling, and surfacing to maximum extent practicable before treatment.

E. Label preservative-treated wood with marking as required by AWPA U1 and ICC (IBC). Unless otherwise permitted by standard U1 and the building code, marking shall include the phrase: AWPA U1, accredited inspection agency's mark, and shall identify treating plant, type of preservative, retention, and end use.

F. Field Treatment for Cuts and Holes in Preservative-Treated Wood: Comply with AWPA M4.

2.06 ACCESSORIES

A. Metal and Finish of Fasteners:
   1. Fire-Retardant-Treated Wood:
      a. Nails, timber rivets, wood screws, and lag screws: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
      b. Fasteners other than staples, nails, timber rivets, wood screws, and lag screws: Mechanically deposited zinc-coated steel, ASTM B695 Class 55 or better.
   2. Preservative-Treated Wood:
      a. Nails, timber rivets, wood screws, and lag screws - general use: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
         1) Exception: Fasteners in interior dry environment with SBX/DOT and zinc-borate treated wood only: Plain carbon steel is permitted.
      b. Fasteners other than staples, nails, timber rivets, wood screws, and lag screws: Mechanically deposited zinc-coated steel, ASTM B695 Class 55 or better.
   3. Untreated Wood: Unfinished steel.
   4. Metal and Finish: Hot-dip galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

5. Anchors: Toggle bolt type for anchorage to hollow masonry.

PART 3 EXECUTION

3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full-width sill flashing over top of foundation, lap ends of flashing minimum of 4 inches (100 mm), and seal.

B. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to greatest extent possible; clearly separate scrap for use on-site as accessory components, including shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code to close concealed draft openings between floors and between top story and roof and attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items unless item can be securely fastened to two or more studs or another method of support is explicitly indicated.

E. Where ceiling mounting is indicated, provide blocking and supplementary supports above ceiling unless another method of support is explicitly indicated.

F. Provide the following specific nonstructural framing and blocking:
1. Cabinets and shelf supports.
2. Wall brackets.
3. Handrails.
4. Grab bars.
5. Towel and bath accessories.
6. Wall-mounted door stops.
7. Chalkboards and marker boards.
8. Wall paneling and trim.
9. Joints of rigid wall coverings that occur between studs.

3.04 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide blocking and nailers required by roofing assembly.

C. Provide wood curb at roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.05 WATERPROOFING-RELATED CARPENTRY

A. Coordinate installation of carpentry with deck construction, framing of openings, and waterproofing assembly installation.

B. Provide blocking and nailers required by waterproofing assembly.

C. Provide wood curb at openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Construction Panels - General: Install in accordance with APA E30.

B. Communications and Electrical Room Mounting Boards: Secure with screws to studs; space fasteners at maximum 24 inches (610 mm) on center.
   1. At fire-rated walls, install board over wallboard indicated as part of fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size: 48 by 96 inches (2440 by 4880 mm), installed horizontally at ceiling height.

3.07 CLEANING

A. Waste Disposal: See Section 017419 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave wood, shavings, sawdust, etc. on ground or buried in fill.

C. Prevent sawdust and wood shavings from entering storm drainage system.

END OF SECTION 061053

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SECTION 061500
WOOD DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plywood roof decking/sheathing.

B. Preservative treatment of wood.

1.02 RELATED REQUIREMENTS

A. Section 061053 - Miscellaneous Rough Carpentry.

B. Section 061753 - Shop-Fabricated Wood Trusses.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. AWPA M4 - Standard for the Handling, Storage, Field Fabrication and Field Treatment of Preservative-Treated Wood Products; 2023.

C. AWPA U1 - Use Category System: User Specification for Treated Wood; 2025.

D. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. PS 1 - Structural Plywood; 2023.

1.04 SYSTEM DESCRIPTION

A. Design roof live and dead load: As indicated on drawings.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on wood treatment materials.

C. Manufacturer's Qualification Statement.

D. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with at least three years of documented experience and certified by AITC.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with at least three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Plywood Decking:
   1. Boise Cascade Company: www.bc.com/#sle.
   2. Georgia-Pacific LLC: www.buildgp.com/#sle.
   3. Weyerhaeuser Company: www.weyerhaeuser.com/#sle.
   4. Substitutions: See Section 016000 - Product Requirements.

2.02 WOOD MATERIALS

A. Plywood Decking: PS 1 veneer plywood; APA Rated Sheathing, Span Rating ____; Exterior grade;1 A interior veneer appearance grade; unsanded.

2.03 PRESSURE-PRESERVATIVE TREATMENT (PPT)

A. Provide factory-treated wood members in accordance with AWPA U1 and use category indicated:

B. Label preservative-treated wood with marking as required by AWPA U1 and ICC (IBC). Unless otherwise permitted by standard U1 and building code, include the following markings: AWPA U1, accredited inspection agency's mark, treating plant identification, type of preservative, preservative retention, and permitted end use.

C. Field Treatment for Cuts and Holes in Preservative Treated Wood: Comply with AWPA M4.

2.04 ACCESSORIES

A. Metal and Finish of Fasteners:
   1. Preservative-Treated Wood:
      a. Nails and wood screws: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
         1) Exception: Fasteners in interior dry environment with SBX/DOT and zinc-borate treated wood only: Plain carbon steel is permitted.
   2. Untreated Decking: Unfinished steel.

B. Flashing Tape: Self-adhering, cold-applied tape to flash deck ledgers and joists.
   1. Width: 2 inches (51 mm).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that support framing is ready to receive decking.

3.02 PREPARATION

A. Coordinate placement of bearing items.

3.03 SITE-APPLIED WOOD TREATMENT

A. Apply preservative treatment to field-cut surfaces in accordance with manufacturer's instructions wherever cuts, holes, sawing, or other fabrication of wood members is required after pressure-preservative treatment.

3.04 INSTALLATION - PLYWOOD DECKING

A. Install decking perpendicular to framing members with ends staggered over firm bearing. On sloped surfaces, lay decking with tongue upward.

B. Engage plywood tongue and groove edges.

C. Allow expansion space at edges and ends.

D. Attach decking with adhesive and screws.

E. Use sheathing clips at unsupported edges of plywood between supporting framing members.

3.05 TOLERANCES

A. Surface Flatness of Decking Without Load: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/2 inch in 30 feet (12 mm / 9 m) maximum.

END OF SECTION 061500

SECTION 061600
SHEATHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sheathing.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 072500 - Weather Barriers.

1.03 REFERENCE STANDARDS

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2026.

B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.

C. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide technical data on sheathing, wood preservative materials, and application instructions.

C. Certificate: Certify that products of this section meet or exceed specified requirements.

D. Specimen warranty.

1.05 QUALITY ASSURANCE

A. Use materials evaluated by Air Barrier Association of America (ABAA).

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Store products above ground in dry ventilated space to protect against moisture. Support stacked products to prevent deformation and allow air circulation.

C. Store panels over stable soil capable of carrying load of pallets.

D. Protect materials from soiling and damage.

E. Deliver materials to site promptly without undue exposure to weather.

F. Deliver in manufacturer’s unopened containers, pallets, or panels fully identified with name, brand, type, and grade.

G. Do not stack panels over plus or minus 1/2 inch (13 mm) off pallet edge.

1.07 FIELD CONDITIONS

A. When mechanically fastened, do not install cementitious reinforced panel when ambient or conditioned temperature is below 0 degrees F (minus 18.6 degrees C).

B. Do not apply finish flooring and roofing over cementitious reinforced panel when wet, frozen, or containing frost.

C. Prior to application of finish flooring and roofing, cementitious reinforced panel or subfloor must be conditioned at same temperature as required for finished flooring for at least 48 hours.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide warranty for material defects and fabrication as noted in manufacturer's documentation. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. American Gypsum: www.americangypsum.com.

B. CertainTeed:www.certainteed.com.

C. Georgis-Pacific Building Products: www.buildgp.com.

D. Gold Bond Building Products: www.goldbondbuilding.com.

E. National Gypsum Company: www.nationalgypsum.com.

F. **USG Corporation: www.usg.com/#sle. (Basis of Design)**

G. Substitutions: See Section 016000 - Product Requirements.

H. Source Limitations: Furnish products produced by single manufacturer and obtained from single supplier.

2.02 SHEATHING

A. Glass-mat-faced gypsum wall sheathing, comply with ASTM C1177/C1177M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Edges: Square.
   3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   4. Products:
      a. USG Corporation; Securock Brand UltraLight Glass-Mat Sheathing Regular.
      b. Substitutions: See Section 016000 - Product Requirements.

2.03 ACCESSORIES

A. Fasteners and Anchors:
   1. General: Refer to manufacturer product information for fastener types and requirements.
   2. Corrosion-resistant steel for 800 hours minimum in accordance with ASTM B117, unless noted otherwise on drawings.
   3. High Humidity and Preservative-Treated Wood Locations: Hot dip galvanized.
   4. Anchors: Toggle bolt type for anchorage to hollow masonry.

B. Panel Treatment: Use manufacturer-recommended sealant, transition trips, flashing sheets, termination bars, patching materials, and adhesive tapes at control joints, panel connections, and penetrations.

C. Sealants:
   1. Medium-modulus, low-VOC, polyurethane for use in joints, penetrations, and transition areas.
      a. USG Corporation; Dymonic 100.
   2. Ultra-low modulus silicone for adhering connections to panels.
      a. USG Corporation; Spectrem 1.

D. Transition Membrane: Silicone extrusion for expansion joints between panels.
   1. USG Corporation; Proglaze ETA Connections.

E. Water-Resistive Barrier: See Section 072726.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and adjoining construction.

B. Replace damaged framing before installation of cementitious panel subfloor. Proceed with installation only after unsatisfactory conditions corrected.

3.02 PREPARATION

A. Coordinate installation of roof and floor deck construction, framing of openings, and other assembly installation.

3.03 INSTALLATION

A. Select material sizes to minimize waste.

B. Reuse and clearly separate scrap for use on-site as accessory components, including shims, bracing, and blocking.

C. Subflooring: Screw and glue to framing according to manufacturer's requirements and installation guides; staples not permitted.
   1. Follow fastener pattern for design diaphragm loads as described in current Progressive Engineering, Inc evaluation report PER-13067.
   2. Follow panel layout in accordance with Structural Panel Concrete Subfloor application described in Progressive Engineering, Inc evaluation report PER-13067.
   3. Ensure panel flush with supporting member; drive fastener heads flush with surface of board.

D. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.
   1. Provide inlet diagonal bracing at corners.
   2. Install control joints at every building construction joint and as recommended by cladding system manufacturer. Refer to sheathing manufacturer for more information.

3.04 TOLERANCES

A. Variation from Plane; Surfaces Other Than Floors: 1/4 inch (2 mm) in 10 feet (3 m), maximum, and 1/4 inch (7 mm) in 30 feet (9.1 m), maximum.

3.05 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

3.06 CLEANING

A. Waste Disposal: See Section 017419 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn pressure treated scraps.

B. Clean material debris, shavings, and sawdust prior to Substantial Completion of project.

3.07 PROTECTION

A. Do not permit traffic over unprotected floor surface.

B. Cover sheathing panels by exterior cladding or other weather-resistive barrier. Do not expose panels to elements for more than 12 months after installation. If exposure anticipated past 12 months, apply joint treatments, weather-resistive barrier, or air barrier according to manufacturer's recommendations.

END OF SECTION 061600

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SECTION 06 17 53 - SHOP-FABRICATED WOOD TRUSSES

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. Wood roof trusses.

1.3 ALLOWANCES

A. Provide wood truss bracing under the Metal-Plate-Connected Truss Bracing Allowance as specified in Section 012100 "Allowances."

1.4 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.

B. Shop Drawings: Show fabrication and installation details for trusses.
1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.

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

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.

B. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.

C. Evaluation Reports: For the following, from ICC-ES:
1. Metal-plate connectors.
2. Metal truss accessories.

1.7 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.

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

B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
3. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.

B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.

1. Design Loads: As indicated.
2. Maximum Deflection under Design Loads: As indicated.

C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.

D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S.
4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.

B. Minimum Specific Gravity for Top Chords: 0.50.

C. Permanent Bracing: Provide wood bracing as required.

2.3 METAL CONNECTOR PLATES

A. Fabricate connector plates to comply with TPI 1.

B. Hot-Dip Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.

2.4 FASTENERS

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

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.

B. Nails, Brads, and Staples: ASTM F1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

A. Allowable design loads, as published by manufacturer, shall comply with or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent

testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.

C. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall below, 1-1/2 inches (38 mm) wide by 0.050 inch (1.3 mm) thick.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.7 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

H. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install bracing as required
2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

I. Install wood trusses within installation tolerances in TPI 1.

J. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

K. Replace wood trusses that are damaged or do not comply with requirements.

1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

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

B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

C. Repair damaged galvanized coatings on exposed surfaces according to ASTM A780/A780M and manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

END OF SECTION 06 17 53

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SECTION 064100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood casework with laminate cladding.

B. Shop finishing.

C. Cabinet and drawer hardware.

1.02 RELATED REQUIREMENTS

A. Section 054000 - Cold-Formed Metal Framing.

B. Section 061053 - Miscellaneous Rough Carpentry.

C. Section 092216 - Non-Structural Metal Framing.

1.03 ABBREVIATIONS AND ACRONYMS

A. AWI: Architectural Woodwork Institute.

B. HPDL: High-pressure decorative laminate.

C. MDF: Medium-density fiberboard.

1.04 REFERENCE STANDARDS

A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).

B. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.

C. ANSI/AWI 0400 - Factory Finishing; 2022.

D. ANSI/AWI 0620 - Finish Carpentry/Installation; 2024.

E. ANSI/AWI 0641 - Architectural Wood Casework; 2019.

F. ASTM D1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials; 2012 (Reapproved 2020).

G. AWI 100 - Submittals; 2018.

H. AWI 200 - Care and Storage; 2018.

I. AWI 300 - Materials; 2018.

J. BHMA A156.9 - Cabinet Hardware; 2020.

K. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; Current Edition.

L. ISO 4586-3 - High-Pressure Decorative Laminates (HPL, HPDL) – Sheets Based on Thermosetting Resins (Usually Called Laminates) – Part 3: Classification and Specifications for Laminates Less than 2 mm Thick and Intended for Bonding to Supporting Substrates; 2018.

M. PS 1 - Structural Plywood; 2023.

N. PS 20 - American Softwood Lumber Standard; 2025.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate schedule of climate-controlled rooms with schedule of storage of wood and wood-based materials requiring climate-controlled environments.
   2. Coordinate work of this section with installation of wood blocking, wood backing, metal strapping, and other anchorage that provides casework backing and structural support.
   3. Coordinate work of this section with rough-in plumbing and rough-in electrical integrally-related with casework.

B. Preinstallation Meeting: Convene preinstallation meeting not less than one week prior to completion of framing behind casework; require attendance of contractor, framing contractor, and casework fabricator.
   1. Review locations of casework backing and structural support.
   2. Review backing attachment method to wall framing as indicated on drawings.

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. AWI QCP Program Submittal Requirements: Comply with AWI 100.

C. Shop Drawings:
   1. General: Each sheet sequentially numbered and dated.
      a. Sheet Size: 11 by 17 inches (280 by 430 mm).
      b. Contents: Indicate project name and project address.
   2. AWI QCP Program Shop Drawing Requirements:
      a. Comply with AWI 100 for shop drawing front matter documentation.
      b. Reference Plans: Casework locations in relative context of building floor plans.
         1) Drawing Scale: 1/4 inch = 1 foot (1:50), minimum.
      c. Plans and Elevations: Plan and elevation views of each assembly type.
         1) Include rough opening dimensions and casework assembly dimensions.
         2) Drawing Scale: 3/4 inch = 1 foot (1:20), minimum.
      d. Detailed Sections: Dimensioned section views of each casework configuration.
         1) Include appropriate locations for casework wall anchorage.
         2) Drawing Scale: 1-1/2 inch = 1 foot (1:10), minimum.
      e. Details: Dimensioned casework assembly details with material thicknesses.

D. Samples:
   1. AWI QCP Program Requirements for Samples: Comply with AWI 100.
   2. Samples, Laminate-Clad Panels: For each laminate-clad type, submit two, laminate-clad sample panels; size: 8 by 8 inches (200 by 200 mm); thickness: 3/4 inch (19 mm).
   3. Samples for Initial Selection:
      a. HPDL Edgebanding: For each edgebanding type, submit two manufacturer's standard palettes, indicating full range of colors.
   4. Samples, Edgebanding:
      a. HPDL Edgebanding: For each edgebanding type, submit two sample strips, 6 inches (150 mm) long, minimum.
   5. Samples, Laminates: For each laminate type, submit two samples for each specified color.
   6. Samples, Hardware: For each hinge type, submit one sample, full-size, indicating specified finish.
   7. Samples, Hardware: For each adjustable shelf standard type, submit one sample, indicating specified finish; size: 6 inches (150 mm).

E. Certificates, AWI: At end of AWI Quality Certification Program process, provide two samples indicating casework complies with specified performance requirements.

F. Fabricator's Instructions: Provide fabricator's installation instructions for shop-fabricated units.

G. Fabricator's qualification statement.

H. Installer's qualification statement.

I. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1.07 QUALITY ASSURANCE

A. Fabricator Qualifications: AWI QCP-licensed woodworking firm.

B. Installer Qualifications: AWI QC-accredited installer.

C. Fabricator/Installer Qualifications: Firm specializing in fabricating and installing products specified in this section with minimum five years of documented experience; with qualifications indicating ability to comply with requirements of this section.
   1. Woodworking company must have at least one project in past five years where value of woodwork was within 20 percent of cost of woodwork for this project.
   2. Single Source Responsibility: Provide fabrication and installation from single woodworking company.

1.08 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver products in original packaging materials bearing product identification.

C. Store products prior to installation on flat, level, clean surfaces; elevate products above floors and protect from sunlight.

D. Store products in interior rooms with completed wet work and overhead work.

E. Relative Humidity Conditions for Storing Wood and Wood-Based Core Products:
   1. Maintain relative humidity between 25 and 45 percent.

F. For products other than wood and wood-based products, store and handle in accordance with fabricator's documented instructions.

G. Handle materials and products to prevent damage to edges, ends, or surfaces.

H. Handle wood products with clean hands or gloves; protect from marks or damage.

1.09 FIELD CONDITIONS

A. Ambient Conditions for Acclimation, Installation, and Post-Installation of Wood-Based Products:
   1. Acclimation Period Prior to Installation: 72 hours minimum, inside installation environment.
   2. Temperature Conditions During Installation and Post-Installation: Maintain temperature between 60 degrees F (16 degrees C) and 90 degrees F (32 degrees C).
   3. Relative Humidity Conditions During Acclimation, Installation, and Post-Installation: Maintain relative humidity between 25 and 45 percent.
   4. Maximum Sustained Time outside Specified Relative Humidity Range: 24 hours.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. EGGER: www.egger.com/#sle.

B. PoliLam: www.polilam.com/#sle.

C. Formica Corporation: www.formica.com/#sle.

D. Panolam Industries International, Inc: www.panolam.com/#sle.

E. **Wilsonart LLC: www.wilsonart.com/#sle. (Basis of Design)**

F. Substitutions: See Section 016000 - Product Requirements.

G. Source Limitations: Furnish products provided by a single fabricator.

2.02 ARCHITECTURAL WOOD CASEWORK

A. Casework Finish: Wood casework with laminate cladding.

B. Provide casework and casework components in sizes and profiles as indicated on drawings.
   1. Interior Clearances: Comply with specified performance requirements.

C. Adjustable Shelves, Number of Shelves Per Cabinet Unit:
   1. Base Cabinets: One shelf for each cabinet unit.
   2. Wall Cabinets: Two shelves for each cabinet unit.

D. Scribed Fillers:

1. Finish and Materials: Same materials and finish as exposed surfaces.

2.03 PERFORMANCE REQUIREMENTS

A. Architectural Woodwork Institute (AWI) Performance Requirements:
   1. Comply with AWI 300, ANSI/AWI 0641, ANSI/AWI 0400, and ANSI/AWI 0620 as applicable for specified casework finish, aesthetic grade, and performance duty level.
      a. Aesthetic Grade: Custom.
      b. Product Performance Duty Level: Duty Level 3.
   2. Panel and Material Thicknesses: Provide panels and materials as required to meet specified performance duty level, subject to minimum thickness requirements of AWI 300 and ANSI/AWI 0641 and flatness requirements indicated below.
   3. Panel Flatness: Provide panels with maximum variation from flat in 12 inches (300 mm) as measured diagonally across panel.
      a. Custom Grade: Plus or minus 0.047 inch (1.2 mm) maximum.
   4. Cabinet Door Flatness:
      a. Comply with specified performance requirements.

2.04 WOOD CASEWORK WITH LAMINATE CLADDING

A. Casework Construction:
   1. Frameless Cabinet and Door Interface: Flush overlay.
   2. Door and Drawer Front Profile: Flush.
   3. Reveal Dimensions: Comply with performance requirements.

B. Wood Drawer Boxes with Laminate Cladding:
   1. Comply with specified performance requirements.

C. Custom Grade - Laminate-Clad Wood Casework:
   1. Exposed Exterior Surfaces, Panels to Receive Laminate Cladding:
      a. HPDL Panels; Surface Finish: As specified.
   2. Exposed Interior Surfaces at Door and Drawer Fronts:
      a. Same laminate materials and thicknesses as exposed exterior surfaces.
         1) Color to match exposed interior or face.
   3. Exposed Interior Surfaces Except Door and Drawer Front Surfaces:
      a. HPDL: Compatible laminate in color to exposed exterior surfaces.
   4. Semi-Exposed Surfaces; Panels to Receive Laminate Cladding:
      a. Fabricator's Option:
         1) HPDL Panels; Surface Finish: As specified.

D. Edgebanding Applications for Laminate-Clad Wood Casework:
   1. Drawer Box Top Edges:
      a. Comply with specified performance requirements.

E. Edgebanding Materials for Laminate-Clad Wood Casework:
   1. Comply with specified performance requirements.

2.05 EDGE TREATMENT APPLICATIONS

A. Front Edges of Frameless Cabinets:
   1. Comply with specified performance requirements.

B. Top Edges of Cabinets:
   1. Comply with specified performance requirements.

C. Bottom Edges of Wall Cabinet Ends and Light Valances:
   1. Comply with specified performance requirements.

D. Bottom Edges of Aprons:
   1. Comply with specified performance requirements.

E. Hinged Door Edges:
   1. Comply with specified performance requirements.

F. Drawer Front and Drawer False Front Edges:
   1. Comply with specified performance requirements.

G. Adjustable Shelf Edges, Semi-Exposed Surfaces:
   1. Comply with specified performance requirements.

H. Edges of Cut-Outs:
   1. Comply with specified performance requirements.

2.06 SOLID WOOD COMPONENTS

A. Description: Components fabricated from solid wood; types include profiled components and flat panels.

B. Comply with specified performance requirements.

2.07 HPDL-CLAD PANELS (PL-1)

A. Description: Panels consisting of High-Pressure Decorative Laminate (HPDL) faces applied to cores; panel layup with face ply, back ply, and core of either single ply or odd number of inner plies, to produce balanced construction panel.
   1. Panels subject to size limitations, minimum thickness requirements, and fabrication tolerances of specified aesthetic grade and performance duty level in accordance with AWI 300 and ANSI/AWI 0641.

B. Flame Retardance: Provide flame-retardant-grade laminates where indicated on drawings.

C. High-Pressure Decorative Laminate (HPDL): Sheet consisting of fibrous material impregnated with thermosetting resins; bonded by high-pressure process.

D. HPDL Laminates Less than 0.08 inch (2 mm) Thick: Comply with ISO 4586-3.
   1. Horizontal Grades:
      a. HPDL HGS; for all horizontal applications.
   2. Vertical Grades:
      a. HPDL VGS; for all vertical applications.
   3. Concealed Backer Materials:
      a. Laminate materials as required for balanced construction panel and recommended by laminate manufacturer for application.
   4. Products:
      a. Wilsonart LLC: www.wilsonart.com/#sle. (Basis of Design)
         1) Exposed Exterior Surfaces, Color, Pattern, and Finish: As indicated on drawings.
         2) Exposed Interior Surfaces, Color: As indicated on drawings.
         3) Semi-Exposed Surfaces, Color: White.
      b. Substitutions: See Section 016000 - Product Requirements.

2.08 PANEL CORES

A. Moisture-Resistant or Fire-Resistant Cores: Provide color-tinting or other distinguishing markings to indicate cores with moisture-resistant or fire-resistant properties.

B. Medium Density Fiberboard (MDF):
   1. Description: Composite panel composed of cellulosic fibers, additives, and bonding system cured under heat and pressure; comply with ANSI A208.2.
   2. Grade and Thickness: As required to meet performance requirements.
   3. Moisture Resistance: MR10; color-tinted to indicate moisture-resistance core.
   4. Ultra-Low-Emitting Formaldehyde (ULEF) Resins: Comply with CARB (ATCM).
   5. No-Added Formaldehyde Based (NAUF) Resins: Comply with CARB (ATCM).

C. Hardboard (HDF):
   1. Description: Panels manufactured from inter-felted lignocellulosic fibers consolidated under heat and pressure to 31 pcf (500 kg/cu m) density or greater; comply with ANSI A135.4.

2. Surfaces: Smooth two sides (S2S).
3. Class and Thickness: As required to meet specified performance requirements. applications.
4. Applications: Dividers.

2.09 CONCEALED CABINET BASE COMPONENTS

A. Cabinet Base Toe-Kick Subfronts:
1. Materials and Size: Fabricator's choice subject to requirements of ANSI/AWI 0641.
2. Height Above Subfloor: 4 inches (100 mm).
3. Finished Face of Toe Kick Subfronts: As indicated on drawings.

B. Cabinet Base Blocking and Stretchers:
1. Materials and Size: Fabricator's choice subject to requirements of ANSI/AWI 0641.
2. Height Above Subfloor: 4 inches (100 mm).

C. Cabinet Base Sleepers:
1. Materials and Size: Fabricator's choice subject to requirements of ANSI/AWI 0641.
2. Height Above Subfloor: 4 inches (100 mm).

2.10 WOOD AND WOOD-BASED MATERIALS

A. Sustainability Characteristics:
1. See Section 016000 - Product Requirements for sustainable product reporting requirements.

B. AWI 200 Wood Moisture Content Requirements:
1. Climate Zone 2: Between 6 and 10 percent.

C. AWI 300 General Requirements for Wood.
1. Provide wood in accordance with AWI 300.

D. Plywood: Comply with PS 1.
1. Performance Category: 23/32 minimum.

E. Wood Boards: Comply with PS 20.
1. Thickness: 11/16 inch (18 mm), actual, minimum.

F. Moisture-Resistant Wood: Where moisture-resistant wood is specified or indicated on drawings for cabinet base components, provide wood with thickness swelling of not more than 5 percent when tested in accordance with ASTM D1037.

G. Wood Anchoring Strips:
1. Materials and Size: Fabricator's choice subject to requirements of ANSI/AWI 0641.

2.11 CABINET AND DRAWER HARDWARE

A. Hinges, Number of Hinges for Each Cabinet Door:
1. Comply with specified performance requirements.

B. Hinges, Self-Closing, Integrated Damper Hinges:
1. Description: Self-closing hinges with integrated damper mechanisms.
2. Comply with BHMA A156.9, B01712.
3. Features: Provide soft-closing integrated damper hinges.
4. Opening Range: Between 115 to 150 to degrees.
5. Material and Finish: Satin anodized aluminum.

C. Cabinet Door Pulls:
1. Description: Back-mounted pulls.
2. Provide one pull for each drawer 24 inches (610 mm) or less in width.
3. Provide one pull for each drawer 24 inches (610 mm) or less in width.
4. Provide two pulls for each drawer over 24 inches (610 mm) in width.
5. Comply with BHMA A156.9, B02011.
6. Design: U-shape wire pulls.

7. Center-to-Center Mounting Dimension: 4 inches (100 mm).
8. Length: 4 inches (100 mm).
9. Material and Finish: Satin anodized aluminum.

D. Shelf Rests:
1. Description: Metal shelf rests for installation into prepared holes in substrate.
2. Comply with BHMA A156.9, B04013.
3. Material and Finish: Satin anodized aluminum.

E. Drawer Slides:
1. Description: Hardware units that suspend drawers and provide controlled drawer sliding.
2. Comply with BHMA A156.9, Standard Duty Grade 2.
3. Mounting: Side-mounted self-closing.
4. Travel: Full extension.
5. Material and Finish: Satin anodized aluminum.

F. Cabinet Door and Drawer Silencers:
1. Description: Self-adhesive rubber silencers.
2. Doors, Quantity: One silencer at top and bottom of closing edge of each door.
3. Drawers, Quantity: One silencer at back side of each drawer front cover.
4. Size: 1/4 inch (6.4 mm) diameter; 1/8 inch (3.2 mm) projection.
5. Color: White.

2.12 CASEWORK ACCESSORY COMPONENTS

A. Edgebanding: ABS, flat, matte finish; width to match component thickness.
1. Color: As selected by Architect from manufacturers' standard range.

2.13 ACCESSORIES

A. Cabinet Connectors.

B. Fasteners: Size and type to suit application.

C. Concealed Joint Fasteners: Threaded steel.

D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

E. Adhesives: Type recommended by fabricator to suit application.

2.14 COUNTERTOP BRACKETS

2.15 FABRICATION

A. Shop-fabricate casework to dimensions, profiles, and details indicated on drawings.

B. Fabricate to maximum extents plausible, including doors, drawers, and hardware; fabricate units in sizes transportable through building openings.

C. Wood Casework with Laminate Cladding: Apply laminates in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.

D. Provide cutouts for plumbing fixtures; verify locations of cutouts from on-site dimensions. Sand and seal cut edges.

E. Edgebanding: Apply where specified; do not use more than one piece for any single length.

F. Hardware: Install hardware in accordance with hardware manufacturer's written instructions; use fasteners supplied by hardware manufacturer.

G. Fabrication Tolerances: Comply with specified performance requirements.

2.16 SHOP FINISHING

A. Surface Preparation: Comply with:
1. ANSI/AWI 0400 for specified aesthetic grade.

B. Shop Finishing: Shop finish architectural wood casework.
   1. Comply with ANSI/AWI 0400 for specified aesthetic grade.

2.17 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify casework and materials required for installation have been delivered, handled and stored as specified.

B. Verify cold-formed backing components that provide backing and structural support for casework are installed as indicated on drawings.

C. Verify wood blocking that provides casework backing is installed as indicated on drawings.

D. Verify location and sizes of rough-in plumbing and rough-in electrical associated with work of this section.

E. Verify location and sizes of cutouts for appliances and special equipment to be mounted in or adjacent to casework.

3.02 PREPARATION

A. Acclimate casework to environments indicated for installation.

3.03 INSTALLATION

A. Install and secure work of this section in accordance with specified performance requirements.

B. Install work of this section rigid, plumb, and level and in accordance with fabricator's documented instructions; secure casework as indicated on drawings.
   1. Align and secure adjoining cabinet units with fasteners in concealed locations.

C. Base and Wall Cabinet Anchorage Support Construction:
   1. See Section 054000 for cold-formed steel stud framing providing backing and structural support for casework.
   2. See Section 061053 for non-load-bearing wood blocking providing backing for casework.
   3. See Section 092116 for non-load-bearing steel blocking providing backing for casework.

D. Install cabinet hardware in accordance with hardware manufacturer's documented instructions using hardware manufacturer's furnished fasteners.

E. Install scribe fillers to close gaps between casework and adjacent walls.

3.04 TOLERANCES

A. Comply with specified performance requirements for tolerances.

B. Maximum Variation From Plumb: 1/8 inch in 96 inches (3.2 mm in 2440 mm).

C. Maximum Variation From Level: 1/8 inch in 96 inches (3.2 mm in 2440 mm).

3.05 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. AWI QCP Inspection Services: Provide AWI QCP installation inspection services.
   1. Inspect for compliance with contract documents; on subjects contract documents are silent, inspect for compliance with specified AWI aesthetic grade.

3.06 ADJUSTING

A. Adjust hardware for smooth operation in accordance with hardware manufacturer's documented instructions.

3.07 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean exposed surfaces of casework, shelving, and hardware.

3.08 PROTECTION

A. Protect installed casework from subsequent construction operations.

END OF SECTION 064100

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SECTION 071400
FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cold-fluid-applied STPE waterproofing.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 033000 - Cast-in-Place Concrete: Concrete substrate.

C. Section 076200 - Sheet Metal Flashing and Trim: Metal parapet covers, copings, and counterflashings.

1.03 REFERENCE STANDARDS

A. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course; 2018 (Reapproved 2022).

B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

C. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

D. ASTM D6163/D6163M - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements; 2021.

E. ASTM D8231 - Standard Practice for the Use of a Low-Voltage Electronic Scanning System for Detecting and Locating Breaches in Roofing and Waterproofing Membranes; 2024a.

F. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

G. ICC-ES AC29 - Acceptance Criteria for Cold, Liquid-Applied, Below-Grade, Exterior Dampproofing and Waterproofing Materials; 2011, with Editorial Revision (2020).

H. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.

C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

D. Certificate: Certify products of this section meet or exceed specified requirements.

E. Test Reports: Submit daily field report (DFR) in accordance with ASTM D8231 indicating details of work performed.

F. Evaluation Service Reports: Show compliance with specified requirements.

G. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.

H. Manufacturer's qualification statement.

I. Installer's qualification statement.

J. Executed warranty.

K. Specimen warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.06 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. Construct mock-up consisting of horizontal and vertical fluid-applied waterproofing to represent finished work, including internal and external corners, drainage panel, base flashings, control joints, counterflashing, and protective cover.

C. Locate where directed.

D. Mock-up may not remain as part of work.

1.07 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F (5 degrees C) for 24 hours before and during application and until cured.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Installer Warranty: Provide 2-year warranty for correcting leaks in waterproofing, unless leakage is caused by structural failure, structural movement, or other causes beyond installer's control, commencing on Date of Substantial Completion. Complete forms in Owner's name and register with installer.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Fluid-Applied Waterproofing:
1. **W. R. Meadows, Inc: www.wrmeadows.com/#sle. (Basis of Design)**
2. Master Builders Solutions: www.master-builders-solutions.com/en-us/#sle.
3. Sika Roofing & Waterproofing: www.hydrotechusa.com/#sle.
4. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
5. Substitutions: See Section 016000 - Product Requirements.

2.02 APPLICATIONS

A. Cold-Fluid-Applied STPE Waterproofing:
1. Location: As indicated on drawings.
2. Cover with drainage panel.

2.03 MATERIALS

A. Cold-Fluid-Applied STPE Waterproofing: Cold-applied, silyl-terminated polyether waterproofing complying with ASTM C836/C836M.
1. Comply with requirements of ICC-ES AC29.
2. Cured Thickness: 60 mils, 0.060 inch (1.52 mm), minimum.
3. Tensile Strength: 100 psi (689 kPa), minimum, measured in accordance with ASTM D412.
4. Ultimate Elongation: 425 percent, minimum, measured in accordance with ASTM D412.
5. Durometer Hardness, Shore OO: 57, minimum, in accordance with ASTM D2240.
6. Water Vapor Permeability: 0.1 perm (6 ng/(Pa s sq m)), maximum, measured in accordance with ASTM E96/E96M, Procedure BW.
7. Products:
   a. **W. R. Meadows, Inc; HYDRALASTIC 836. (Basis of Design)**
   b. Master Builders Solutions: www.master-builders-solutions.com/en-us/#sle.
   c. Sika Roofing & Waterproofing: www.hydrotechusa.com/#sle.
   d. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.

e. Substitutions: See Section 016000 - Product Requirements.

B. Flexible Flashings: 60-mil, 0.060-inch (1.52 mm) minimum thickness, butylene.

2.04 ACCESSORIES

A. Sealant for Joints and Cracks in Substrate: Type compatible with waterproofing material and as recommended by waterproofing manufacturer.

B. Tack-Reducing Surfacing: Portland cement, Type 1.

C. Protection Course: SBS-modified asphalt, reinforced with nonwoven fabric; smooth surface, complying with ASTM D6163/D6163M, Type I, Grade S.
1. Products:
a. W. R. Meadows, Inc; PC2R PROTECTION COURSE.

D. Cant Strips: Premolded composition material.

E. Counterflashing: See Section 076200.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.

C. Verify substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of waterproofing materials.

D. Verify items penetrating surfaces to receive waterproofing are securely installed.

E. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.

F. Do not proceed with this work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing from damage.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.

C. Remove and replace areas of defective concrete; see Section 033000.

D. Do not apply waterproofing to surfaces unacceptable to waterproofing manufacturer.

E. Fill nonmoving joints and cracks with filler compatible with waterproofing materials.

F. Seal moving cracks with sealant and nonrigid filler, using procedures recommended by sealant and waterproofing manufacturers.

G. Prepare building expansion joints at locations as indicated on drawings.

H. Install cant strips at inside corners.

3.03 INSTALLATION

A. Install waterproofing to specified minimum thickness in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.

B. Apply primer or surface conditioner at rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

C. At joints and cracks less than 1/2 inch (13 mm) in width, including joints between horizontal and vertical surfaces, apply 12-inch (300 mm) wide strip of joint cover sheet.

D. At joints from 1/2 to 1 inch (12.7 to 25.4 mm) in width, loop joint cover sheet down into joint between 1-1/4 to 1-3/4 inch (31.8 to 44.5 mm), and extend sheet at least 6 inches (152 mm) on either side of expansion joint.

E. Center joint cover sheet over joints, roll sheet into 1/8-inch (3.2 mm) thick coating of waterproofing material, and apply second coat over sheet extending at least 6 inches (152 mm) beyond sheet edges.

F. Apply extra thickness of waterproofing material at corners, intersections, and angles.

G. Flexible Flashings: Seal items penetrating through waterproofing with flexible flashings.

H. Seal flashings to adjoining surfaces.
   1. Install termination bar along edges of sheet products.
   2. Install counterflashing over exposed edges.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Provide daily on-site attendance of waterproofing and insulation manufacturer's representative during installation of this work.

3.05 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION 071400

SECTION 072100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at cavity wall construction, perimeter foundation wall, and exterior wall behind exterior wall finish.

B. Batt insulation in exterior wall, ceiling, and roof construction.

C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 061053 - Miscellaneous Rough Carpentry: For wood blocking requirments..

C. Section 072119 - Foam-in-Place Insulation.

D. Section 075323 - EPDM Thermoset Single-Ply Roffing: Installation requirements for board insulation over low slope roof deck.

1.03 DEFINITIONS

A. Mineral Fiber Material Composition: Insulation referred to as mineral fiber block, board, and blanket insulation is composed of fibers from mineral based substances such as rock, slag, or glass and processed from the molten state into fibrous form.
   1. Based on type of insulation substance, the material will be referred to as a mineral fiber when having a rock or slag base, and glass fiber with a glass or silica sand base, also considered a mineral.
   2. Insulation blankets are flexible units consisting of felted, bonded, or unbonded fibers formed into rolls or flat cut pieces referred to as batts; rolls are simply longer versions of batts.
   3. For additional information about mineral fiber and the various classification types, refer to the following reference standards; ASTM C553, ASTM C612, ASTM C665, and ASTM C726.

1.04 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023, with Editorial Revision (2024).

B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.

D. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2025.

F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.

G. ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board; 2024.

H. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

I. ASTM D4833/D4833M - Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products; 2007 (Reapproved 2020).

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

K. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2026.

L. ASTM E1414/E1414M - Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum; 2021a.

M. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Shop Drawings: Submit drawings that indicate location of joint or termination detail conditions.

D. Samples for Verification: Submit two samples 12 by 12 inches (304.8 by 304.8 mm) in size illustrating insulation.

E. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

H. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

I. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of contractor accreditation and installer certification on project site during and after installation. Present on-site documentation upon request.

1.06 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
   1. Installer Qualification: Use accredited contractors, certified installers, evaluated materials, and third-party field quality control audit.
   2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.07 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.

B. Insulation Inside Masonry Cavity Walls: Extruded polystyrene (XPS) board.

C. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.

D. Insulation in Wood or Metal Framed Ceiling Structure: Batt insulation with integral vapor retarder.

E. Insulation over Roof Deck: See Section 075323 for insulation board.

2.02 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
   1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.

2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
4. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
5. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
6. Board Edges: Square.
7. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
8. Products:
    a. **DuPont de Nemours, Inc; Styrofoam Brand Cavitymate Plus: building.dupont.com/#sle. (Basis of Design)**
    b. Kingspan Insulation LLC: www.kingspan.com/#sle.
    c. Owens Corning Corporation: www.owenscorning.com/en-us/#sle.
    d. Substitutions: See Section 016000 - Product Requirements.

2.03 MINERAL FIBER BLANKET INSULATION MATERIALS

A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Formaldehyde Content: Zero.
5. Thermal Resistance: R-value (RSI-value) as indicated on drawings.
6. Thickness: As indicated on drawings.
7. Facing: Unfaced.
8. Products:
    a. CertainTeed Corporation: www.certainteed.com/#sle.
    b. Johns Manville: www.jm.com/#sle.
    c. Knauf Insulation: www.knaufinsulation.com/#sle.
    d. Owens Corning Corporation: www.owenscorning.com/en-us/#sle.
    e. Substitutions: See Section 016000 - Product Requirements.

B. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Formaldehyde Content: Zero.
5. Thermal Resistance: R-value (RSI-value) as indicated on drawings.
6. Thickness: As indicated on drawings.
7. Facing: Aluminum foil, flame spread 25 rated; one side.
8. Products:
    a. CertainTeed Corporation: www.certainteed.com/#sle.
    b. Johns Manville: www.jm.com/#sle.
    c. Knauf Insulation: www.knaufinsulation.com/#sle.
    d. Owens Corning Corporation: www.owenscorning.com/en-us/#sle.
    e. Substitutions: See Section 016000 - Product Requirements.

C. Mineral Fiber Enclosure for Recessed Ceiling Fixtures: Insulated box enclosure with foil facing on exterior side for placement over recessed ceiling light fixture; flame spread index of 25 or less, and smoke development index of 450 or less when tested in accordance with ASTM E84.
1. Light Fixture Size: As indicated on drawings.

2. Insulation Thickness: 1-1/4 inch (31.8 mm), nominal.
3. Thermal Resistance: R-value (RSI-value) of 4.2 (0.74) per inch, minimum, at 75 degrees F (24 degrees C), minimum, when tested according to ASTM C518.
4. Provide enclosure with documented noise reduction coefficient (NRC) in accordance with ASTM C423 of at least 1.00 at 2 inches (51 mm) thick.
5. Provide enclosure with documented ceiling attenuation class (CAC) in accordance with ASTM E1414/E1414M.
6. Products:
   a. Specialty Products & Insulation (SPI); SafeLite: www.spi-co.com/#sle.
   b. Substitutions: See Section 016000 - Product Requirements.

2.04 ACCESSORIES

A. Foundation Insulation and Drainage Board: Flexible board comprised of majority post-industrial recycled content, providing both subgrade insulation and drainage.
   1. Application: Install vertically directly against acceptable substrates.
   2. Board Thickness: 1-1/4 inches (31.8 mm).
   3. Index Puncture Resistance of Geomembranes and Related Products: 54 lb, 3/4 inch (25.5 kg, 19.1 mm), in accordance with ASTM D4833/D4833M.
   4. Steady-State Thermal Transmission Properties: R-value (RSI-value) of 3 (0.53) for 3/4 inch (19.1 mm) thickness, in accordance with ASTM C518.
   5. Products:
      a. Nu-Wool; INSULDRI: https://nuwool.com/#sle.
      b. Substitutions: See Section 016000 - Product Requirements.

B. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
   1. Application: Sealing of interior circular penetrations, such as pipes or cables.
   2. Width: Are required for application.
   3. Products:
      a. SIGA Cover Inc; SIGA-Rissan: www.siga.swiss/global_en/#sle.
      b. Substitutions: See Section 016000 - Product Requirements.

C. Self-Adhered Transition Flashing: Multipurpose, self-adhered flashing with modified butyl adhesive, polyester fiber top sheet, and polypropylene interlayer.
   1. Application: Primerless adhesion for use as through-wall flashings and wall transitions to roof and below-grade systems.
   2. Thickness: 45 mil, 0.045 inch (1.14 mm), nominal.
   3. Size: 6 inches (152 mm) wide, in rolls 75 feet (23 m) long.
   4. Tensile Strength: Greater than 1,300 psi (8963 kPa) complying with ASTM D412 test method.
   5. Products:
      a. DuPont de Nemours, Inc; DuraGard CM Transition Flashing: building.dupont.com/#sle.
      b. Substitutions: See Section 016000 - Product Requirements.

D. Flashing Tape: Special reinforced film with high performance adhesive.
   1. Application: Window and door opening flashing tape.
   2. Width: As required for application.
   3. Primer: Tape manufacturer's recommended product.
   4. Products:
      a. Rmax Inc; R-SEAL 6000: www.rmax.com/#sle.
      b. Substitutions: See Section 016000 - Product Requirements.

E. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
   1. Width: 3-1/2 inches (89 mm).
   2. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.

F. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch (50 mm) wide.
   1. Products:

G. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Apply adhesive to back of boards:
   1. Three continuous beads per board length.

B. Install boards horizontally on foundation perimeter.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and to protrusions.

C. Extend boards over expansion joints, unbonded to foundation on one side of joint.

D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

E. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.
   1. Apply adhesive in five continuous beads per board length.
   2. Install boards horizontally from base of foundation to top of insulation.
   3. Butt boards tightly, with joints staggered from insulation joints.

3.03 BOARD INSTALLATION AT CAVITY WALLS

A. Secure insulation fasteners to substrate at following frequency:
   1. Six (6) per insulation board.

B. Apply adhesive to back of boards:
   1. Three continuous beads per board length.
   2. Full bed 1/8 inch (3.2 mm) thick.

C. Install boards to fit snugly between wall ties.
   1. Place membrane surface against adhesive.
   2. Place membrane surface facing out, and tape seal board joints.

D. Install boards horizontally on walls.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and protrusions.
   4. Place impale fastener locking discs.

E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.04 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

A. Installation of board insulation over low slope roof deck, see Section 075323 - EPDM Thermoset Single-Ply Roofing.

3.05 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Tape insulation batts in place.

F. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over face of member

G. Tape seal tears or cuts in vapor retarder.

H. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane; tape seal in place.

3.06 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Coordination of Air Barrier Association of America (ABAA) Tests and Inspections:
   1. Provide testing and inspection required by ABAA Quality Assurance Program (QAP).
   2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
   3. Cooperate with ABAA testing agency.
   4. Allow access to air barrier work areas and staging.
   5. Do not cover air barrier work until tested, inspected, and accepted.

3.07 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION 072100

SECTION 072119
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foamed-in-place insulation.
   1. In masonry cavity walls.
   2. In exterior framed walls.
   3. In exterior wall crevices.
   4. At junctions of dissimilar wall and roof materials.

1.02 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

C. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

D. FM 4880 - Examination Standard for Class 1 Fire Rating of Building Panels or Interior Finish Materials; 2022.

E. NFPA 275 - Standard Method of Fire Tests for the Evaluation of Thermal Barriers; 2022.

F. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

G. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction; Current Edition, Including All Revisions.

H. UL 1715 - Standard for Safety Fire Test of Interior Finish Material; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.

C. Certificates: Certify that products of this section meet or exceed specified requirements.

D. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection as required by ABAA QAP.

E. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

G. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.

C. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
   1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
   2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.06 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. See Section 014000 - Quality Requirements for additional requirements.

C. Provide exterior wall mock-up,as indicated on drawings; include insulation overcoat, wall construction, window and frame, and door frame in mock-up.

D. Locate where directed.

E. Mock-up may not remain as part of work.

1.07 FIELD CONDITIONS

A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

B. Do not apply foam when temperature is within 5 degrees F (2.78 degrees C) of dew point.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Foamed-In-Place Insulation:
   1. **BASF Corporation: www.spf.basf.com/#sle. (Basis of Design)**
   2. Carlisle Spray Foam Insulation: www.carlislesfi.com/#sle.
   3. Gaco Western: www.gaco.com/#sle.
   4. Huntsman Building Solutions: www.huntsmanbuildingsolutions.com/#sle.
   5. Johns Manville: www.jm.com/#sle.
   6. NCFI Polyurethanes: www.ncfi.com/#sle.
   7. Preferred Solutions, Inc: www.preferredsolutions.net/#sle.
   8. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS

A. Foamed-In-Place Insulation: Low-density, flexible, closed cell, water vapor permeable polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
   1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and fire protection requirements.
      a. Fire Protection: Provide 15-minute thermal barrier of 1/2 inch (12.7 mm) gypsum board or equivalent material complying with NFPA 275 test method, or foamed-in-place insulation either exposed or with covering that complies with FM 4880, NFPA 286, UL 1040, or UL 1715.
   2. Thermal Resistance: R-value (RSI-value) of 7.2 (1.296), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature when tested in accordance with ASTM C518.
   3. Air Permeance: 0.04 cfm per square foot (0.2 L/(s/sq m)), maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf (75 Pa).
   4. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
   5. Basis of Design:
      a. **BASF Corporation; WALLTITE HFO Series: www.spf.basf.com/#sle. (Basis of Design)**
   6. Other Acceptable Products:

a. Carlisle Spray Foam Insulation: www.carlislesfi.com/#sle.
b. Gaco Western: www.gaco.com/#sle.
c. Johns Manville: www.jm.com/#sle.
d. NCFI Polyurethanes: www.ncfi.com/#sle.
e. Preferred Solutions, Inc: www.preferredsolutions.net/#sle.

7. Substitutions: See Section 016000 - Product Requirements.

2.03 ACCESSORIES

A. Primer: As required by insulation manufacturer.

B. Protective Coating: Sprayed, treated with flame retardants as required to comply with applicable codes.
1. Coating Type: Recycled paper.
2. Thermal Resistance, R-value (RSI-value): 4.5 (0.79), at 1 1-2 inch (38.1 mm) thickness when tested in accordance with ASTM C518.
3. Noise Reduction Coefficient (NRC): 0.95 for 1-1/4-inch (31.7 mm) thickness installed over foam.
4. Bond Strength: 100 psf (488 kPa), minimum.
5. Flame Spread/Smoke Developed Index: 5/5, Class A, when tested in accordance with ASTM E84.
6. Color: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify work within construction spaces or crevices is complete before insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

A. Apply insulation in accordance with manufacturer's instructions.

B. Apply insulation by spray method, to a uniform monolithic density without voids.

C. Apply to a minimum cured thickness of 3 inch (76.2 mm) and R-value indicated on drawings.

D. Do not apply cellulose fiber insulation in areas where temperatures exceed 150 degrees F (65.6 degrees C).

E. Patch damaged areas.

F. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.

G. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Field inspections and tests will be performed by an independent testing agency.

C. Inspection will include verification of insulation and protective coating thickness and density.

D. Coordination of ABAA Tests and Inspections:
1. Provide testing and inspection required by ABAA QAP.
2. Notify in ABAA writing of schedule for air barrier work. Allow adequate time for testing and inspection.
3. Cooperate with ABAA testing agency.
4. Allow access to air barrier work areas and staging.

5. Do not cover air barrier work until tested, inspected, and accepted.

3.05 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION 072119

SECTION 072123
LOOSE-FILL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Loose-fill insulation in attics, cells of concrete masonry unit (CMU) walls, and spaces between masonry wythes.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 042000 - Unit Masonry: Masonry wall system to receive loose-fill insulation.

1.03 REFERENCE STANDARDS

A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. ASTM C549 - Standard Specification for Perlite Loose Fill Insulation; 2023.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Certificates: Certify that products of this section meet or exceed specified requirements.

D. Manufacturer's Instructions: Indicate procedures for preparation and installation.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
   1. Perlite manufacturer is a member of Perlite Institute: www.perlite.org/#sle.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Perlite Loose-Fill Insulation:
   1. Supreme Perlite Company: www.perlite.com/#sle.
   2. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS

A. Perlite Loose-Fill Insulation: ASTM C549, perlite type, water repellent, fire resistant; flame spread/smoke developed index of 0/0, when tested in accordance with ASTM E84.

B. Thermal Resistance: Provided minimum values in accordance with applicable edition of ASHRAE Std 90.1 I-P for envelope requirements of building location and climate zone.

C. Provide loose-fill insulation in accordance with requirements of Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

2.03 APPLICATIONS

A. Provide loose-fill insulation in the following application(s) as indicated on drawings:
   1. Unit masonry wall system, refer to Section 042000.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate and adjacent materials are dry and ready to receive insulation.

B. Verify wall spaces are free of mortar blockage allowing for free flow of insulation.

3.02 PREPARATION

A. Verify holes and openings have been sealed to prevent escape of insulation.

3.03 INSTALLATION

A. Install loose-fill insulation in accordance with manufacturer's instructions.

B. Deposit loose-fill insulation after masonry wall has sufficiently dried to manufacturer's suggested optimum moisture content prior to covering cores with bond beams or lintels.

C. Deposit loose-fill insulation as wall is erected and completely fill spaces.

D. Deposit loose-fill insulation in lifts, and do not exceed 6 feet (1.83 m) pouring height.

3.04 PROTECTION

A. Place temporary signs warning workers in areas that contain loose-fill insulated walls to use caution and to prevent loss of insulation when cutting into walls.

END OF SECTION 072123

SECTION 074113
METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal roof panel system of preformed aluminum panels.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 053100 - Steel Decking: Metal roof decking.

C. Section 054400 - Cold-Formed Metal Trusses: Metal roof framing.

D. Section 061053 - Miscellaneous Rough Carpentry: Wood blocking.

E. Section 061500 - Wood Decking: Wood Roof sheathing.

F. Section 061753 - Shop-Fabricated Wood Trusses: Wood roof framing.

G. Section 072100 - Thermal Insulation: Rigid roof insulation.

H. Section 077200 - Roof Accessories: Snow Guards.

I. Section 079200 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

D. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2024.

E. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2025.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

H. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2025.

I. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995 (Reapproved 2024).

J. ASTM E1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems; 2016 (Reapproved 2022).

K. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2024, with Editorial Revision (2025).

L. ICC-ES AC188 - Acceptance Criteria for Roof Underlayments; 2023.

M. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Summary of test results, indicating compliance with specified requirements.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Specimen warranty.

C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
   1. Show work to be field-fabricated or field-assembled.
   2. Include structural analysis signed and sealed by qualified structural engineer, indicating compliance of roofing system to specified loading conditions.

D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches (305 mm) square, representing actual roofing metal, thickness, profile, color, and texture.
   1. Include typical panel joint in sample.
   2. Include typical fastening detail.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Test Reports: Indicate compliance of metal roofing system to specified requirements.

I. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section and with at least three years of documented experience.
   1. Accredited by IAS in accordance with IAS AC472.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Provide strippable plastic protection on prefinished roofing panels for removal after installation.

C. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.07 FIELD CONDITIONS

A. Do not install metal roof panels, eave protection membrane or underlayment when surface, ambient air, or wind chill temperatures are below 45 degrees F (7 degrees C).

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Finish Warranty: Provide 10-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

C. Special Warranty: Provide 5-year warranty for weathertightness of roofing system, including agreement to repair or replace metal roof panels that fail to keep out water commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Architectural Metal Roof Panel Manufacturers:
   1. ATAS International, Inc: www.atas.com/#sle.
   2. Berridge Manufacturing Company: www.berridge.com/#sle.
   3. Metal Roofing Systems, Inc: www.metalroofingsystems.biz/#sle.
   4. **Petersen Aluminum Corporation; PAC T-250 Panel: www.pac-clad.com/#sle. (Basis of Design)**
   5. Substitutions: See Section 016000 - Product Requirements.

B. Metal Soffit Panels Manufacturers:
   1. ATAS International, Inc: www.atas.com/#sle.
   2. Berridge Manufacturing Company: www.berridge.com/#sle.
   3. Metal Roofing Systems, Inc: www.metalroofingsystems.biz/#sle.
   4. **Petersen Aluminum Corporation; PAC-750 Soffit: www.pac-clad.com/#sle. (Basis of Design)**
   5. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Metal Roof Panels: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:
   1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed L/180 of span length(L) when tested in accordance with ASTM E1592.
      a. Dead Loads: Weight of roofing system.
      b. Live Loads: As required by ASCE 7.
   2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
   3. Wind Uplift: Class 90 wind uplift resistance of UL 580.
   4. Air Infiltration: Maximum 0.06 cfm/sq ft (1.1 cu m/hr/sq m) at air pressure differential of 6.24 lbf/sq ft (300 Pa), when tested according to ASTM E1680.
   5. Water Penetration: No water penetration when tested in accordance with procedures and recommended test pressures of ASTM E1646; perform test immediately following air infiltration test.
   6. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F (56 degrees C).
   7. Thermal Resistance: Provide throughout system, R-value (RSI-value) of 15 (2.6) at 2 inch (51 mm) thick, minimum, when tested in accordance with ASTM C1363.

2.03 METAL ROOF PANELS

A. Metal Roof Panels: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.

B. Metal Panels: Factory-formed panels with factory-applied finish.
   1. Aluminum Panels:
      a. Alloy and Temper: Aluminum complying with ASTM B209/B209M; temper as required for forming.
      b. Thickness: Minimum 18 gauge, 0.040 inch (1.0 mm).
   2. Profile: Standing seam, with minimum 1-inch (25.4 mm) seam height; concealed fastener system for snap-on application of matching standing seam batten.
   3. Texture: Smooth.
   4. Length: Full length of roof slope, without lapped horizontal joints.
   5. Width: Maximum panel coverage of 18 inches (457 mm).
   6. Color: Cardinal Red.

C. Metal Soffit Panels:

1. Profile: Style as indicated, with venting provided.
2. Material: Precoated aluminum sheet, 20 gauge, 0.032 inch (0.81 mm) minimum thickness.
3. Color: Cardinal Red.

2.04 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.05 FABRICATION

A. Panels: Provide factory or field fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.06 FINISHES

A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch (0.023 mm); color and gloss as selected by Architect from manufacturer’s standard line.

2.07 ACCESSORIES

A. Miscellaneous Sheet Metal Items: Provide flashings, trim, moldings, closure strips, and caps of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.

C. Sealants:
1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
3. Seam Sealant: Factory-applied, non-skinning, non-drying type.

D. Thermal Insulation: Provide flexible blanket, rigid, or semi-rigid type, faced with white, flexible, non-dusting vapor retarder tested for maximum flame spread index of 50, per ASTM E84; for installation using spacer blocks.

E. Underlayment: Self-adhering polymer modified asphalt sheet complying with ASTM D1970/D1970M, with strippable release film and top surface of woven polypropylene sheet.
1. Minimum Requirements: Comply with requirements of ICC-ES AC188 for non-self-adhesive sheet.
2. Sheet Thickness: 22 mils, 0.022 inch (0.55 mm), minimum.
3. Self Sealability: Nail sealability in accordance with ASTM D1970/D1970M.
4. Low Temperature Flexibility: Comply with ASTM D1970/D1970M.
5. Water Vapor Permeance: 0.1 perm (5.72 ng/Pa s sq m), maximum, when tested in accordance with ASTM E96/E96M using Desiccant Method (Method A).
6. Functional Temperature Range: Minus 45 degrees F (Minus 42.8 degrees C) to 250 degrees F (121 degrees C).
7. Products:
   a. Certainteed Roofing; WinterGuard HT - High Temperature Waterproofing Underlayment: www.certainteed.com/#sle.
   b. Henry, a Carlisle Company; Blueskin RF200: www.henry.com/#sle.

c. Polyglass USA, Inc; Polystick MTS Self-Adhered High Temperature Roof Underlayment: www.polyglass.us/#sle.
d. Protecto Wrap Company: www.protectowrap.com/#sle.
e. System Components Corporation, Inc; FelTex SA300: www.systemcomponents.net/#sle.
f. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to ensure that completed roof will be free of leaks.

B. Coordinate installation of waterproof membrane over roof sheathing with Section 061000.

C. Remove protective film from surface of roof panels immediately prior to installation; strip film carefully to avoid damage to prefinished surfaces.

D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by metal roof panel manufacturer.

E. Protect surrounding areas and adjacent surfaces from damage during execution of this work.

F. At locations where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

A. Overall: Install roofing system in accordance with approved shop drawings and metal roof panel manufacturer's instructions and recommendations, as applicable to specific project conditions; securely anchor components of roofing system in place allowing for thermal and structural movement.
   1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
   2. Minimize field cutting of panels. Where field cutting is required, use methods that will not distort panel profiles. Use of torches for field cutting is prohibited.

B. Accessories: Install necessary components that are required for complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. Install roofing underlayment on roof sheathing before installing preformed metal roof panels; secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners; apply from eaves to ridge in shingle fashion, overlapping horizontal joints at least 2 inches (50 mm) and side and end laps at least 3 inches (75 mm); offset seams in building paper and seams in roofing felt.

D. Roof Panels: Install metal roof panels in accordance with manufacturer's installation instructions, minimizing transverse joints except at junction with penetrations.
   1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by panel manufacturer.
   2. Provide concealed clips at panel joints, and apply snap-on battens to provide weathertight joints.
   3. Provide sealant tape or other approved joint sealer at lapped panel joints.

4. Install sealant or sealant tape at end laps and side joints as recommended by metal roof panel manufacturer.

E. Insulation: Install insulation between roof covering and supporting members to present a neat appearance; fold, staple, and tape seams unless otherwise approved by Architect.
   1. Install batt insulation in areas concealed from view.

3.04 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.05 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION 074113

SECTION 074213.23
METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal composite material wall panel system.

B. Metal composite material soffit/ceiling panel system.

C. Metal composite material copings.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 054000 - Cold-Formed Metal Framing: Support framing.

C. Section 072119 - Foamed-in-place insulation: Weather barrier.

D. Section 076200 - Sheet Metal Flashing and Trim.

E. Section 079200 - Joint Sealants.

1.03 ABBREVIATIONS AND ACRONYMS

A. MCM: Metal Composite Material.

1.04 REFERENCE STANDARDS

A. AAMA 508 - Voluntary Test Method and Specification for Pressure Equalized Rainscreen Wall Cladding Systems; 2021.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

H. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2025.

I. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2025b.

J. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

K. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

M. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

N. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

O. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

P. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

Q. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

R. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
   1. Require attendance by installer and relevant subcontractors.
   2. Include MCM sheet manufacturer’s representative and wall system manufacturer’s representative to review storage and handling procedures.
   3. Establish procedures to maintain performance requirements for air barrier, water barrier, and panel substrate.

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Wall System: Manufacturer's data sheets on each product.
   2. MCM Panels: Manufacturer's data sheets on each product.

C. Shop Drawings: Indicate layout, elevations, dimensions of panels, connections, details and location of joints, sealants, gaskets, method of anchorage, support clips, anchors, supports, reinforcement, trim, flashings, and accessories.
   1. Indicate panel numbering system.
   2. Differentiate between shop and field fabrication.
   3. Indicate adjustments required to coordinate with adjacent work within wall system.
   4. Include large scale details of anchorages and connecting elements.
   5. Include details or schematic, exploded, or isometric diagrams to explain flashing at scale of minimum 1-1/2 inches equals 12 inches (1:10).
   6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.

D. Samples:
   1. For Initial Selection: For each finish product, including sealants, provide three color chips representing manufacturer's standard range of available colors and patterns.
   2. For Verification: For each finish product, including sealants, provide three samples, minimum 12-inch (305 mm) squares, representing product color and texture.

E. Design Data: Indicate structural calculations stamped by design engineer for Architect's information and project record.

F. Test Reports: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.

G. Test Reports: Provide report indicating compliance with NFPA 285 for previously tested exterior wall assembly.

H. Field Quality Control Submittals: Provide field report within 48 hours of field review. Record requested or required observations and changes.

I. Designer's qualification statement.

J. Manufacturer's qualification statement.

K. Fabricator's qualification statement.

L. Installer's qualification statement.

M. Testing agency's qualification statement.

N. Operation and Maintenance Data: Indicate care of finishes and warranty requirements.

O. Executed warranty.

P. Specimen warranty.

1.07 QUALITY ASSURANCE

A. Designer Qualifications: Perform design of structural supports and anchorages under direct supervision of Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum three years of documented experience.

C. Fabricator Qualifications: Company specializing in manufacturing wall panel systems specified in this section with minimum three years of documented experience.

D. Installer Qualifications: Company specializing in performing work of type specified and with minimum three years of documented experience.

E. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

F. Preconstruction Testing: Have specimen representative of project conditions tested by independent testing agency for compliance with specified thermal, structural, air infiltration, and water penetration criteria.

1.08 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. See Section 014000 - Quality Requirements for additional requirements.

C. Provide mock-up, as indicated on drawings; include panel system, supports, attachments to building frame, associated air and water barrier materials, weep drainage system, sealants and seals, and related wall insulation.

D. Locate where directed.

E. Provide specified finish on panels.

F. Mock-up may not remain as part of work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver products in manufacturer's original, unopened, and undamaged containers with identification labels intact.

C. Storage:
   1. Store products protected from exposure to harmful weather conditions and at temperatures recommended by manufacturer.
   2. Store in well-ventilated space out of direct sunlight.
   3. Protect from moisture and condensation with weathertight covering installed to provide ventilation.
   4. Store at slope, ensuring positive drainage of accumulated water.

1.10 FIELD CONDITIONS

A. Ambient Conditions:

1. Fabricate and install system only when existing and forecasted weather conditions permit assembly in accordance with manufacturer's instructions and warranty requirements.
2. Do not field fabricate or install panels when air temperature or relative humidity are outside manufacturer's limits.

1.11 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 10-year manufacturer warranty for MCM panels. Complete forms in Owner's name and register with manufacturer.

C. Installer Warranty: Provide 2-year warranty for rainscreen assembly commencing on Date of Substantial Completion. Complete forms in Owner's name and register with installer.

D. Finish Warranty: Provide 20-year manufacturer warranty against excessive degradation of finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Alcotex, Inc: www.alcotex.com/#sle.

B. Alfrex, LLC: www.alfrexusa.com/#sle.

C. ALPOLIC Materials: www.alpolic-americas.com/#sle.

D. **ALUCOBOND by 3A Composites USA; ALUCOBOND PLUS - Dry Reveal: www.alucobondusa.com/#sle. (Basis of Design)**

E. Arconic Architectural Products LLC: www.arconic.com/#sle.

F. ATAS International, Inc: www.atas.com/#sle.

G. Carter Architectural Panels, Inc: www.elval-colour.com/#sle.

H. Citadel Architectural Products, Inc: www.citadelap.com/#sle.

I. Fairview Architectural LLC: www.fairview-na.com/#sle.

J. Lumabuilt: www.lumabuilt.com/#sle.

K. Stacbond: www.stacbond.com/#sle.

L. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Structural Performance: Comply with ASTM E330/E330M.
1. Size components to support assembly dead loads and withstand live loads caused by positive and negative wind pressure acting normally to wall plane.
2. Design Wind Loads: Comply with ASCE 7.
3. Maximum Allowable Deflection:
   a. Panels: L/60 for length (L) of span.
   b. Perimeter Framing: L/175 normal to plane of wall.
   c. Anchors: 1/16 inch (1.6 mm) at connection points to framing members.

B. Thermal Movement: Provide system accomodating expansion and contraction from thermal movement at material temperature range of minus 20 degrees F (minus 29 degrees C) to 180 degrees F (82 degrees C) without noise, buckling, or damage to system components.

C. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec/sq m) maximum leakage when tested at 6.24 psf (300 Pa) pressure difference in accordance with ASTM E283/E283M.

D. Water Penetration: No water penetration after 15 minutes of static pressure when tested in accordance with ASTM E331 and AAMA 508 at differential of 10 percent of inward acting design load, 6.27 psf (300 Pa) minimum.

E. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.

F. Fire Performance: Comply with NFPA 285.

G. Building Envelope Performance: Comply with ASHRAE Std 90.1 I-P when tested as part of building envelope assembly.

2.03 METAL COMPOSITE MATERIAL WALL PANEL SYSTEM (ACM-1)

A. Description: Rainscreen type; metal panels, fasteners, and anchors designed for use with supports provided by others.

B. Provide watertight and structurally sound wall panel system that prevents uncontrolled water penetration on inside face of system.

C. MCM Panels: Comprised of two 0.020-inch (0.50 mm) thick aluminum sheet facings bonded to extruded thermoplastic core.
   1. Thickness: 0.157 inch (4 mm).
   2. Size: As indicated on drawings.
   3. Core: Fire retardant.
   4. Exterior Finish: PVDF fluoropolymer.
   5. Provide manufacturer's standard stiffeners to maintain panel flatness without showing local stresses or read-through on panel face.
   6. Provide concealed attachment to supporting structure with attachment members adhered to back of panel.
   7. Provide structural silicone sealant approved by MCM panel manufacturer for securing attachment members to back of panels.

D. Steel Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
   1. Provide material strength, dimensions, and configuration as required by structural engineer to meet applied loads and in accordance with applicable building code.

E. Drainage Holes: AAMA 508, 3/8-inch (9.525 mm) diameter, 16 inches (406.4 mm) on center.

2.04 MATERIALS

A. Aluminum Sheet: ASTM B209/B209M, 6061 alloy, T6 temper.

B. Aluminum Extrusions: ASTM B221 and ASTM B221M.

2.05 FABRICATION

A. Fabricate panels as indicated on drawings and as recommended by MCM sheet manufacturer:
   1. Rout and return panel edges.
   2. Ensure panel lines, breaks, curves, and angles are sharp and true.
   3. Keep plane surfaces free from warp or buckle.
   4. Keep panel surfaces free of scratches or marks.

2.06 FINISHES

A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multicoat superior performing organic coatings system complying with AAMA 2605, including minimum 70 percent PVDF resin, with minimum 80 percent of coil-coated metal surfaces having minimum total dry film thickness of 0.9 mil, 0.0009 inch (0.023 mm); color and gloss as indicated on drawings.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.07 ACCESSORIES

A. Flashing: Sheet aluminum, minimum 18 gauge, 0.040 inch (1 mm) thick; finish matching MCM sheet.

B. Coping: As indicated on drawings.

C. Support for Cladding and Continuous Insulation: Continuous thermal Z-girts.

1. Fiberglass reinforced plastic (FRP) girts that provide cladding attachment support for exterior wall cladding and metal wall panels.
2. Depth: As indicated on drawings.
3. Length: 6 inches (152 mm) for clips; 96 inches (2438 mm) for girts.
4. Spacing: 16 inches (406 mm) on center, vertically.
5. Fasteners: As recommended by clip manufacturer.

D. Anchors, Clips, and Accessories: Provide one of the following:
1. Stainless Steel: Comply with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666/A666M.
2. Steel: Comply with ASTM A36/A36M; hot-dip zinc coated in accordance with ASTM A153/A153M.
3. Steel: Comply with ASTM A36/A36M; hot-dip galvanized in accordance with ASTM A123/A123M, with coating thickness grade of 100.

E. Fasteners:
1. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
2. Bolts: Stainless steel.
3. Fasteners for Flashing and Trim: High-strength aluminum or stainless steel blind fasteners.

F. Joint Sealer: See Section 079200.

G. Provide panel system manufacturer's and installer’s standard corrosion-resistant accessories, including fasteners, clips, anchorage devices, and attachments.

2.08 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Testing of Pressure Equalized Rain Screen (PERS) Panel System: Submit results complying with AAMA 508 test methods for PERS metal plate wall panel system similar to system specified.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine dimensions, tolerances, and interfaces with other work.
1. Verify weather barrier installation. See Section 072119 - Foamed-in-place insulation.
2. Verify installation of air- or water-resistive barriers over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Verify acceptability of substrate conditions for MCM system installation in accordance with manufacturer's instructions.
1. Provide documentation indicating detrimental conditions to MCM system performance.

C. Verify installation of girts, angles, channels, studs, and other structural support members and anchorage to ensure installation within alignment tolerances as required by panel manufacturer.

D. Do not proceed with erection until unsatisfactory conditions are corrected. Notify Architect, in writing, of conditions that impede timely completion of work.

3.02 PREPARATION

A. Protect adjacent work areas and finish surfaces from damage during installation.

B. Furnish setting templates for items cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Do not install defective products, including warped, bowed, dented, and broken members and members with damaged finishes.

B. Install panel system in accordance with fabricator's instructions, manufacturer's instructions, and approved shop drawings.

C. Secure attachment members to back face of panels in accordance with MCM sheet manufacturer's instructions.

D. Do not form panels in field unless required by wall system manufacturer and approved by Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.

E. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape to prevent electrolytic action between metals.

F. Install flashing as indicated on shop drawings. At flashing butt joints, provide lap strap under flashing and seal lapped surfaces with full bed of nonhardening sealant.

G. Dry Jointing: Secure extrusions to returned pan edges with stainless steel rivets; provide concealed drainage with baffles and weeps for water accumulating in members.

H. Track Support:
   1. Attach MCM wall panels to tracks by interlocking panel edges with fabricator's standard T-clips.
   2. Install support assembly at locations, spacings, and with fasteners recommended by manufacturer.
   3. Provide fabricator's standard horizontal and vertical tracks for support and secondary drainage assembly; ensure drainage to exterior at horizontal joints through drain tube.

3.04 TOLERANCES

A. Installation Tolerances:
   1. Shim and align MCM wall panel units on level and plumb within tolerance of 1/4 inch in 20 feet (6 mm in 6 m), noncumulative.
   2. Install panels within 1/8 inch (3 mm) offset of adjoining faces and of alignment of matching profiles.

3.05 REPAIR

A. Touch up, repair, or replace damaged wall panels and accessories in manner indistinguishable from undamaged components.

3.06 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Manufacturer Services: Provide services of manufacturer's field representative to inspect installation site and provide product use recommendations in accordance with manufacturer's instructions.

3.07 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

C. Remove protective films, temporary coverings, and temporary protection.

D. Clean installed products in accordance with manufacturer's instructions.

3.08 PROTECTION

A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION 074213.23

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SECTION 074646
FIBER-CEMENT SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiber-cement siding.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 054000 - Cold-Formed Metal Framing: Siding substrate.

C. Section 072119 - Foamed-in-place insulation: Weather barrier.

D. Section 076200 - Sheet Metal Flashing and Trim.

E. Section 079200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

A. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets; 2022, with Editorial Revision (2023).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's requirements for related materials to be installed by others.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods, including nail patterns.

C. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, and methods of anchorage.

D. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

G. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.

H. Warranty: Submit copy of manufacturer’s warranty, made out in Owner’s name, showing that it has been registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified in this section with not less than three years of experience.

1.06 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. See Section 014000 - Quality Requirements for additional requirements.

C. Provide mock-up, as indicated on drawings; include panel system, supports, attachments to building frame, associated air and water barrier materials, weep drainage system, sealants and seals, and related wall insulation.

D. Locate where directed.

E. Provide specified finish on panels.

F. Mock-up may not remain as part of work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver and store materials in manufacturer's unopened packaging, with labels intact, until ready for installation.

C. Store materials under dry and waterproof cover, well ventilated, and elevated above grade on a flat surface.

D. Protect materials from harmful environmental elements, construction dust, and other potentially detrimental conditions.

1.08 FIELD CONDITIONS

A. Do not install panels when air temperature or relative humidity are outside manufacturer's limits.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

C. Manufacturer Warranty: Provide manufacturer warranty for years as indicated under Fiber-Cement Siding article sub-headings for "Warranty". Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 FIBER-CEMENT SIDING

A. Panel Siding (CWP-1): Vertically oriented panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
   1. Length (Height): 98 inches (2500 mm), nominal.
   2. Width: 52 inches (1310 mm), nominal.
   3. Thickness: 1/2 inch (13 mm), nominal.
   4. Finish: Ferro.
   5. Color: Ivory.
   6. Warranty: 50 year limited; transferable.
   7. Products:
      a. Allura, a division of Plycem USA, Inc: www.allurausa.com/#sle.
      b. James Hardie Building Products, Inc: www.jameshardie.com/#sle.
      c. Nichiha USA, Inc: www.nichiha.com/#sle.
      d. **Rieder; Standard GR03/F03: www.rieder.cc/. (Basis of Design)**
      e. Substitutions: See Section 016000 - Product Requirements.

2.02 ACCESSORIES

A. Support for Cladding and Continuous Insulation: Continuous thermal Z-girts.
   1. Fiberglass reinforced plastic (FRP) girts that provide cladding attachment support for exterior wall cladding.
   2. Depth : As indicated on drawings.
   3. Length: 6 inches (152 mm) for clips and 96 inches (2438 mm) for girts.
   4. Spacing: 16 inches (406 mm) on center, vertically.
   5. Fasteners: As recommended by clip manufacturer.

B. Trim: Same material and texture as siding.

C. Metal Trim: Extruded aluminum alloy 6063-T5 temper.
   1. Finish: Powder coating.
      a. Color: To match siding color.

D. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inches (31.8 mm), minimum.

E. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.

F. Finish Paint: Latex house paint acceptable to siding manufacturer; primer recommended by paint manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Verify that water-resistant barrier has been installed over substrate completely and correctly; see Section 054000.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Protect surrounding areas and adjacent surfaces during execution of this work.

B. Install Sheet Metal Flashing:
   1. Above door and window trim and casings.
   2. Above horizontal trim in field of siding.

3.03 INSTALLATION

A. Install siding in accordance with manufacturer's instructions and recommendations.
   1. Read warranty and comply with terms necessary to maintain warranty coverage.
   2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
   3. Use trim details as indicated on drawings.
   4. Touch up field cut edges before installing.
   5. Pre-drill nail holes if necessary to prevent breakage.

B. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.

C. Do not install siding less than 6 inches (152 mm) from ground surface, or closer than 1 inch (25.4 mm) to roofs, patios, porches, and other surfaces where water may collect.

D. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

E. Finish Painting: Within one week after installation, paint siding and trim with one coat primer and two coats finish paint.

3.04 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean faced panels in accordance with manufacturer’s maintenance instructions, using cleaning materials and methods acceptable to manufacturer.

3.05 PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 074646

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SECTION 075323
EPDM THERMOSET SINGLE-PLY ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Adhered roof system with ethylene propylene diene monomer (EPDM) roofing membrane.

B. Insulation, flat and tapered.

C. Vapor retarder.

D. Deck sheathing.

E. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 053100 - Steel Decking.

C. Section 076200 - Sheet Metal Flashing and Trim: Counterflashing and reglets.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.

C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2025.

D. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 2011 (Reapproved 2023).

E. ASTM D312/D312M - Standard Specification for Asphalt Used in Roofing; 2016a (Reapproved 2023).

F. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015, with Editorial Revision (2022).

G. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces; 2024.

H. FM DS 1-28 - Wind Design; 2015, with Editorial Revision (2025).

I. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; 2016, with Editorial Revision (2022).

J. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.
   1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturer's written information listed below.
   1. Product data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.

D. Samples for Selection: Submit two samples 6 by 6 inches (152.4 by 152.4 mm) in size illustrating insulation, coating, and fleece backing.

E. Samples for Verification: Submit two samples 6 by 6 inches (152.4 by 152.4 mm) in size illustrating insulation, coating, and fleece backing.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and other supplementary instructions.

H. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

I. Specimen Warranty: For approval.

J. Warranty:
   1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
   2. Submit installer's certification that installation complies with all warranty conditions for the waterproof membrane.

K. Manufacturer's Qualification Statement.

L. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum twenty (20) years of documented experience.

B. Installer Qualifications: Company specializing in performing work of this section:
   1. With minimum five years documented experience.
   2. Approved by membrane manufacturer.
   3. Extend manufacturer's labor and materials guarantee.
   4. Extend manufacturer's No Dollar Limit guarantee.

1.07 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. See Section 014000 - Quality Requirements for additional requirements.

C. Provide mock-up for evaluation of surface preparation, installation methods, and workmanship.

D. Locate where directed.

E. Mock-up may not remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

C. Protect products in weather protected environment, clear of ground and moisture.

D. Protect foam insulation from direct exposure to sunlight.

E. Keep Safety Data Sheets (SDS) at the project site at all times during transportation, storage, and installation of materials.

F. Comply with requirements from Owner to prevent overloading or disturbance of the structure when loading materials onto the roof.

1.09 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather. Refer to manufacturer's written instructions.

B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

D. Proceed with work so new roofing materials are not subject to construction traffic as work progresses.

E. Do not allow grease, oil, fats, or other contaminants to come into direct contact with membrane.

1.10 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Material Warranty: Provide membrane manufacturer's warranty agreeing to replace material that shows manufacturing defects within 20 tears after installation.

C. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
   1. Warranty Term: 20 years.
   2. For repair and replacement include costs of both material and labor in warranty.
   3. Include damage caused by 1 inch (25 mm) maximum diameter hail.
   4. Include damage caused by 2 inch (51 mm) maximum diameter hail.
   5. Exceptions NOT Permitted:
      a. Damage due to roof traffic.
      b. Damage due to wind of speed greater than 56 mph (90 km/h) but less than 90 mph (145 km/h).

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. **Carlisle SynTec Systems: www.carlisle-syntec.com/#sle. (Basis of Design)**

B. Elevate: www.holcimelevate.com/#sle.

C. GenFlex Roofing Systems, LLC: www.genflex.com/#sle.

D. Johns Manville: www.jm.com/#sle.

E. Mule-Hide Products Co, Inc: www.mulehide.com/#sle.

F. Versico Roofing Systems: www.versico.com/#sle.

G. Substitutions: See Section 016000 - Product Requirements.

2.02 ROOFING APPLICATIONS

A. EPDM Membrane Roofing: One ply membrane, fully adhered, over insulation.

B. Roofing Assembly Performance Requirements and Design Criteria:
   1. Solar Reflectance Index (SRI): Minimum of 64 based on three-year aged value; if three-year aged data is not available, minimum of 82 initial value.
      a. Calculate SRI in accordance with ASTM E1980.
      b. Field applied coating may not be used to achieve specified SRI.
   2. Roof Covering External Fire Resistance Classification: Class A when tested per UL 790.
   3. Wind Uplift:
      a. Designed to withstand wind uplift forces calculated with ASCE 7.
      b. Design Wind Speed: In accordance with local building code and authorities having jurisdiction (AHJ).
   4. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.

5. Insulation Thermal Resistance (R-Value): Provide R-Value over entire roof deck in accordance with local building code requirements.
6. Drainage: No standing water within 48 hours after precipitation.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Single Source Responsibility: Provide and install products from single source.

B. Base Sheet: Manufacturer's standard, non-asphaltic, resin-bound, fiberglass-reinforced mat with mineral-filled, fire-resistant coating on one side.
   1. Product: Carlisle FR Base Sheet 1S.

C. Membrane:
   1. Material: Ethylene propylene diene monomer (EPDM); ASTM D4637/D4637M, Type II (internally reinforced with fabric or scrim).
   2. Thickness: 60 mil, 0.060 inch (1.5 mm), minimum.
   3. Sheet Width: Factory fabricated into largest sheets possible.
   4. Color: Black.
   5. Products:
      a. Carlisle SynTec Systems; Sure-Tough.

D. Seaming Materials: As recommended by membrane manufacturer.

E. Vapor Retarder: Material approved by roof manufacturer complying with requirements of fire rating classification; compatible with roofing and insulation materials.
   1. Fire-retardant adhesive.

F. Flexible Flashing Material: Same material as membrane.

G. Base Flashing: Provide waterproof, fully adhered base flashing system at all penetrations, plane transitions, and terminations.

2.04 DECK SHEATHING AND COVER BOARDS

A. Deck Sheathing and Cover Board: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 1/2 inch (13 mm) thick.
   1. Product:
      a. GP Dens-Deck Prime, distributed by Carlisle SynTec Systems.

2.05 INSULATION

A. Polyisocyanurate (ISO) Board Insulation: ASTM C1289, Type II, Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of the core foam; Grade 2.
   1. Compressive Strength: 20 psi (138 kPa).
   2. Product:
      a. Carlisle SynTec Systems; SecurShield.
   3. Tapered Board: Slope as indicated; minimum thickness 1/2 inch (13 mm); fabricate of fewest layers possible.

2.06 ACCESSORIES

A. Prefabricated Roofing Expansion Joint Flashing: Sheet butyl over closed-cell foam backing seamed to galvanized steel flanges.

B. Prefabricated Flashing Accessories:
   1. Corners and Seams: Same material as membrane, in manufacturer's standard thicknesses.
   2. Penetrations: Same material as membrane, with manufacturer's standard cut-outs, rigid inserts, clamping rings, and flanges.
   3. Sealant Pockets: Same material as membrane, with manufacturer's standard accessories, in manufacturer's standard configuration.
   4. Carlisle SynTec Systems; Sure-Seal Pressure-Sensitive Reinforced Universal Securement Strip (RUSS):

C. Asphalt Primer: ASTM D41/D41M primer for concrete decks, existing smooth built-up roofing, mineral surfaced cap sheet, or modified bitumen membranes.

D. Hot Asphalt: ASTM D312/D312M.

E. Insulation Adhesive: Two component polyurethane, expanding foam.
   1. Product:
      a. Carlisle SynTec Systems; One Step.

F. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches (152 mm) wide; self-adhering.

G. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.

H. Membrane Adhesive: As recommended by membrane manufacturer.

I. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

J. Sealants: As recommended by membrane manufacturer.

K. Cleaner: Manufacturer's standard, clear, solvent-based cleaner.

L. Primer: Manufacturer's recommended product.

M. Edgings and Terminations: Manufacturer's standard edge and termination accessories.

N. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
   1. Composition: Asphaltic with mineral granule surface or Roofing membrane manufacturer's standard.
   2. Size: As indicated on drawings.
   3. Surface Color: Match roofing material color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 PREPARATION, GENERAL

A. Clean substrate thoroughly prior to roof application.

B. Do not begin work until other work that requires foot or equipment traffic on roof is complete.

C. Apply manufacturer's recommended vapor retarder or temporary roof before roof installation.

3.03 METAL DECK PREPARATION

A. Install deck sheathing on metal deck:
   1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
   2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
   3. Tape joints.

B. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual FM DS 1-28 recommendations and roofing manufacturer's instructions.
   1. Over entire roof area, fasten sheathing using six fasteners with washers per sheathing board.
   2. At roof perimeter to 4 feet (1.2 m) in from edges, fasten sheathing using 6 fasteners with washers per board.

3.04 INSTALLATION - GENERAL

A. Perform work in accordance with manufacturer's instructions.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

F. Coordinate the work with installation of associated counterflashings installed by other sections as the work of this section proceeds.

G. When substrate preparation is responsibility of another installer, notify Architect of unsatisfactory conditions before proceeding.

3.05 VAPOR RETARDER INSTALLATION

A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
   1. Extend vapor retarder under cant strips and blocking to deck edge.
   2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

3.06 INSULATION APPLICATION

A. Attachment of Insulation:
   1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual FM DS 1-29 requirements.
   2. Embed second layer of insulation into full bed of adhesive in accordance with roofing and insulation manufacturer's instructions.

B. Do not install wet, damaged, or warped insulation boards.

C. Lay subsequent layers of insulation with joints staggered minimum 6 inches (152 mm) from joints of preceding layer.

D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

E. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.

F. Lay boards with edges in moderate contact without forcing, and gap between boards no greater than 1/4 inch (6.4 mm). Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

G. Tape joints of insulation in accordance with roofing and insulation manufacturers instructions.

H. At roof drains, use factory-tapered boards to slope down to roof drains over 18 inches (457 mm).

I. Do not apply more insulation than can be completely waterproofed in the same day.

3.07 MEMBRANE APPLICATION

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Apply adhesive at manufacturer's recommended rate. Fully embed membrane in adhesive except in areas directly over or within 3 inches (76 mm) of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches (76 mm). Seal permanently waterproof.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches (102 mm) onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.

F. Install roofing expansion joints where indicated, and ensure joints are watertight.

G. Install prefabricated joint components in accordance with manufacturer's instructions.

H. Coordinate installation of roof drains and sumps and related flashings, locate field splices away from low areas and roof drains, and lap upslope sheet over downslope sheet.

I. Install walkway pads at areas of concentrated traffic as indicated on drawings, and space pad joints to permit drainage.

J. Daily Seal: Install daily seal per manufacturer's instructions at the end of each workday. Prevent infiltration of water at incomplete flashings, terminations, and at unfinished membrane edges.

3.08 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for general requirements for field quality control and inspection.

B. Require site attendance of roofing and insulation material manufacturers daily during installation of this work.

3.09 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Remove wrappings, empty containers, paper, and other debris from the roof daily. Dispose of debris in compliance with local, State, and Federal regulations.

C. Remove bituminous markings from finished surfaces.

D. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

E. Repair or replace defaced or damaged finishes caused by work of this section.

3.10 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION 075323

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SECTION 076200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, exterior penetrations, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 077123 - Manufactured Gutters and Downspouts.

1.03 REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

B. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

E. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2015a (Reapproved 2021).

F. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement; 2025.

G. CDA A4050 - Copper in Architecture - Handbook; Current Edition.

H. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples, 6 by 6 inches (152.4 by 152.4 mm) in size, illustrating material of typical standing seam.

D. Samples: Submit two samples,6 by 6 inches (152.4 by 152.4 mm) in size, illustrating metal finish color.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Maintain one copy of each document on site.

C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Sheet Metal Flashing and Trim:
   1. ALUCOBOND by 3A Composites USA: www.alucobondusa.com/#sle.
   2. Fairview Architectural LLC: www.fairview-na.com/#sle.
   3. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
   4. Petersen Aluminum Corporation: www.pac-clad.com/#sle.
   5. Soprema, Inc: www.soprema.us/#sle.
   6. Tamlyn: www.tamlyn.com/#sle.
   7. Taylor Metal Products: www.taylormetal.com/#sle.
   8. Substitutions: See Section 016000 - Product Requirements.

2.02 SHEET MATERIALS

A. Anodized Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 0.032 inch (0.81 mm) thick; clear anodized finish.
   1. Clear Anodized Finish: AAMA 611, AA-M12C22A41, Class I, clear anodic coating not less than 0.7 mil, 0.0007 inch (0.018 mm) thick.
   2. At low-slope roof counter flashing only.

B. Stainless Steel: ASTM A666/A666M, Type 304 alloy, soft temper, 28 gauge, 0.0156 inch (0.40 mm) thick; smooth No. 4 - Brushed finish.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch (450 mm) long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

G. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

2.04 GUTTERS AND DOWNSPOUTS

A. See Section 077123 for manufactured gutters and downspouts.

B. Seal metal joints.

2.05 FLASHING

A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.06 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Underlayment: ASTM D2178/D2178M, glass fiber roofing felt.

C. Primer Type: Zinc chromate.

D. Protective Backing Paint: Zinc molybdate alkyd.

E. Concealed Sealants: Non-curing butyl sealant.

F. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

G. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch (0.38 mm).

3.03 INSTALLATION

A. Insert flashings into reglets to form tight fit; secure in place with lead wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.

B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Exterior Flashing Receivers: Install in accordance with manufacturer's recommendations, and in proper relationship with adjacent construction, and as follows:

F. Solder metal joints for full metal surface contact, and after soldering wash metal clean with neutralizing solution and rinse with water.

G. Secure gutters and downspouts in place with concealed fasteners.

H. Slope gutters 1/4 inch per 10 feet (2.1 mm per m), minimum.

I. Connect downspouts to downspout boots, and grout connection watertight.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION 076200

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SECTION 077100
ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured roof specialties, including copings, fascias, and gravel stops.

B. Factory fabricated cornices.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 077200 - Roof Accessories: Manufactured curbs, roof hatches, and snow guards.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2022.

C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement; 2025.

D. NRCA (RM) - The NRCA Roofing Manual; 2026.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

D. Samples: Submit two appropriately sized samples of coping and gravel stop.

E. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Roof Edge Flashings and Copings:
   1. Architectural Products Co: www.archprod.com/#sle.
   2. ATAS International, Inc: www.atas.com/#sle.
   3. Drexel Metals Inc: www.drexmet.com/#sle.
   4. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
   5. Metal-Era Inc: www.metalera.com/#sle.
   6. Metal Roofing Systems, Inc: www.metalroofingsystems.biz/#sle.
   7. Substitutions: See Section 016000 - Product Requirements.

B. Pipe and Penetration Flashings:
   1. Elmdor: www.elmdor.com/#sle.
   2. Substitutions: See Section 016000 - Product Requirements.

C. Counterflashings:
   1. ATAS International, Inc: www.atas.com/#sle.
   2. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
   3. Metal-Era Inc: www.metalera.com/#sle.
   4. Substitutions: See Section 016000 - Product Requirements.

D. Pipe Penetration Wall Seal:
   1. Airex Manufacturing, Inc: www.airexmfg.com/#sle.

2. Substitutions: See Section 016000 - Product Requirements.

E. Pipe Penetration Wall Seal and Insulation Protection System:
1. Airex Manufacturing, Inc: www.airexmfg.com/#sle.
2. Substitutions: See Section 016000 - Product Requirements.

2.02 COMPONENTS

A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
1. Configuration: Fascia, cant, and edge securement for roof membrane.
2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.
3. Exposed Face Height: As indicated on drawings.
4. Material: Formed aluminum sheet, 0.050 inch (1.3 mm) thick, minimum.
5. Finish: 70 percent polyvinylidene fluoride (PVDF).
6. Color: To match color of the metal roofing panels.

B. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness, and finish as cap; concealed stainless steel fasteners.
2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
3. Wall Width: As indicated on drawings.
4. Outside Face Height: As indicated on drawings.
5. Inside Face Height: As indicated on drawings.
6. Material: Formed aluminum sheet, 0.040 inch (1.01 mm) thick, minimum.
7. Finish: 70 percent polyvinylidene fluoride.
8. Color: As selected by Architect from manufacturer's standard range.
9. Products:
a. ATAS International, Inc; Rapid-Lok Coping: www.atas.com/#sle.
b. Hickman Edge Systems; PermaSnap Cantilever Coping: www.hickmanedgesystems.com/#sle.
c. Metal-Era Inc; One Edge Coping: www.metalera.com/#sle.
d. Substitutions: See Section 016000 - Product Requirements.

C. Factory Fabricated Metal Composite Material Coping: See Section 074213.23 - Metal Composite Material Wall Panels.
1. Color: To match color of the metal wall panels.
2. Products: Same manufacturer as metal composite material wall panel system.

D. Pipe and Penetration Flashing: Base of rounded aluminum, compatible with sheet metal roof systems, and capable of accomodating pipes sized between 3/8 inch (9.5 mm) and 12 inches (305 mm).
1. Caps: EPDM.

E. Roof Penetration Sealing Systems: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.

F. Counterflashings: Factory fabricated and finished sheet metal that overlaps top edges of base flashing by at least 4 inches (102 mm), and designed to snap into through-wall flashing or reglets with lapped joints.

G. Pipe Penetration Wall Seal: Seal for HVAC piping wall penetrations with wall-mounted rigid plastic outlet cover and elastomeric wall seal gasket.
1. Outlet Cover Color: Gray.

H. Pipe Penetration Wall Seal and Insulated Piping Protection System: Seal for HVAC piping wall penetrations with wall-mounted rigid plastic outlet cover and elastomeric wall seal gasket and having mechanical line insulation with PVC protective cover.
   1. Outlet Cover Color: Gray.
   2. PVC Insulation Cover Color: Black with full-length velcro fastener.

2.03 FINISHES

A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

2.04 ACCESSORIES

A. Sealant for Joints in Linear Components: As recommended by component manufacturer.

B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

C. Insulation Board Adhesive: Two-component, low-rise polyurethane foam adhesive used for adhering insulation to low slope roof deck materials.

D. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Seal joints within components when required by component manufacturer.

C. Anchor components securely.

D. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

E. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

F. Coordinate installation of flashing flanges into reglets.

END OF SECTION 077100

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SECTION 077123
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gutters and downspouts.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 055000 - Metal Fabrications: Downspout boots.

C. Section 076200 - Sheet Metal Flashing and Trim.

1.03 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2022.

C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

D. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2025.

E. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.

F. CDA A4050 - Copper in Architecture - Handbook; Current Edition.

G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on prefabricated components.

C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

D. Samples: Two sample assemblies, 12 inches (305 mm) long, illustrating component design, finish, color, and configuration.

E. Manufacturer's installation instructions.

F. Executed warranty.

1.05 QUALITY ASSURANCE

A. Documents at Project Site: Maintain at project site one copy of shop drawings and reference standard documents containing execution requirements.

1.06 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. Construct a mock-up panel sized as indicated on drawings; include gutters, downspouts, and skuppers in mock-up.

C. Locate where directed.

D. Mock-up may not remain as part of work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Stack material to prevent twisting, bending, or abrasion and to provide ventilation. Slope to drain.

C. Prevent contact with materials that cause discoloration, staining, or damage.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 5-year manufacturer warranty for material and workmanship. Complete forms in Owner's name and register with manufacturer.

C. Special Warranty: Provide 30-year warranty for wind damage commencing on Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

D. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior PVDF finish. Include provision for replacing units with excessive fading or chalking. Complete forms in Owner's name and register with manufacturer.
   1. Chalking: No.8 rating, maximum, when tested in accordance with ASTM D4214.
   2. Color Retention: No fading or color change exceeding 5 Hunter color difference units, calculated in accordance with ASTM D2244.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Gutters and Downspouts:
   1. Alside, Inc: www.alside.com/#sle.
   2. ATAS International, Inc: www.atas.com/#sle.
   3. Cheney Flashing Company: www.cheneyflashing.com/#sle.
   4. Drexel Metals Inc: www.drexmet.com/#sle.
   5. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
   6. Metal-Era Inc: www.metalera.com/#sle.
   7. SAF Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc: www.saf.com/persys/#sle.
   8. Substitutions: See Section 016000 - Product Requirements.

2.02 DESIGN CRITERIA

A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by storm occurrence of 1 in 5 years.

B. Comply with applicable code for size and method of rainwater discharge.

2.03 GUTTERS AND DOWNSPOUTS

A. Gutters: SMACNA (ASMM) rectangular profile.

B. Downspouts: Profile as indicated in construction documents.

C. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, scuppers, and end caps; minimum 14-inch (355 mm) long legs on corner pieces.
   1. Scuppers and Conductor Heads: Welded watertight. Set in sealant and secured to structure.

D. Anchors and Supports: Profiled to suit gutters and downspouts.
   1. Anchoring Devices: Type recommended by manufacturer.
   2. Gutter Supports: Brackets.
   3. Downspout Supports: Brackets.

E. Fasteners: Aluminum, with soft neoprene washers.

2.04 DOWNSPOUT BOOTS

A. See Section 055000.

2.05 SHOP FABRICATION

A. Form gutters and downspouts of profiles and size indicated in construction documents.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints; comply with CDA A4050

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.06 FINISHES

A. Prefinished Aluminum Sheets: Factory-applied topcoat systems applied to aluminum flat sheet substrates prior to fabrication by coil coating; topcoat systems consist of primers and organic topcoats on exposed side and backing coats on unexposed side.
   1. Aluminum Sheet Substrates: ASTM B209/B209M, alloy and temper as recommended by manufacturer for application.
   2. High-Performance Organic Coating System: Comply with AAMA 2604 for aluminum preparation, pretreatment, primer, and finish coat system; provide thermally cured, 50-percent PVDF or silicone-modified polyester systems; tested for weathering for 5 years with 5 delta units color change maximum.
   3. Application: Gutters and downspouts.
      a. Coating System: High-performance organic coating system.
      b. Color: As selected by Architect from manufacturer's full colors.

2.07 MATERIALS

A. Aluminum Sheet: ASTM B209/B209M; 0.032 inch (0.8 mm) thick.
   1. Finish: Class I anodized.
   2. Color: As selected by Architect from manufacturer's standard colors.

B. Prefinished Aluminum Sheet: ASTM B209/B209M; 0.032 inch (0.8 mm) thick.
   1. Finish: Plain, shop precoated with polyvinylidene fluoride (PVDF) coating.
   2. Color: As selected by Architect from manufacturer's standard colors.

2.08 ACCESSORIES

A. Flashing: See Section 076200.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify surfaces are acceptable for product installation in accordance with manufacturer's written instructions.

3.02 PREPARATION

A. Paint concealed sheet metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mils, 0.015 inch (0.381 mm).

3.03 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.

B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.

C. Slope gutters 1/4 inch per 10 feet (1:480), minimum.

D. Connect downspouts to downspout boots at 12 inches (305 mm) above grade. Grout connection watertight.

END OF SECTION 077123

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SECTION 077200
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof curbs.

B. Equipment rails.

C. Roof penetrations mounting curbs.

D. Roof hatches.

E. Non-penetrating pedestals.

F. Snow guards.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 077100 - Roof Specialties: Other manufactured roof specialty items.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2025.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
   1. Non-penetrating Rooftop Supports: Submit design calculations for loadings and spacings.
   2. Snow Guards: Submit design calculations for loadings and spacings based on manufacturer testing.
   3. Submit shop drawings sealed and signed by a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

D. Warranty Documentation:
   1. Submit manufacturer warranty.
   2. Ensure that forms have been completed in Owner's name and registered with manufacturer.
   3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Store products under cover and elevated above grade.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 ROOF CURBS

A. Roof Curbs Manufacturers:
   1. Active Ventilation Products, Inc: www.roofvents.com/#sle.
   2. AES Industries Inc: www.aescurb.com/#sle.
   3. The Pate Company: www.patecurbs.com/#sle.
   4. LMCurbs: www.lmcurbs.com/#sle.
   5. MKT Metal Manufacturing: www.mktduct.com/#sle.
   6. Substitutions: See Section 016000 - Product Requirements.

B. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
   1. Roof Curb Mounting Substrate: Curb substrate consists of standing seam metal roof panel system.
   2. Sheet Metal Material:
      a. Aluminum: 0.080 inch (2.03 mm) minimum thickness, with 3003 alloy, and H14 temper.
   3. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slope at top of roofing system at 1:1 slope; minimum cant height 4 inches (102 mm).
   4. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
      a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch (152 mm) clearance between curb and metal roof panel flange allowing water to properly flow past curb.
      b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
      c. Maintain at least 12 inch (305 mm) clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
      d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.

C. Roof Curb Caps: Square-type aluminum cap with weathertight seal when vent or equipment is not installed.
   1. Size: 20 by 20 inches (508 by 508 mm).

D. Curbs Adjacent to Roof Openings: Provide curb on each side of opening, with top of curb horizontal for equipment mounting.
   1. Provide preservative treated wood nailers along top of curb.
   2. Insulate inside curbs with 1-1/2 inch (38 mm) thick fiberglass insulation.
   3. Height Above Finished Roof Surface: 8 inches (203 mm), minimum.

E. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.

F. Equipment Support: Straight curbs on each side of equipment, with top of curbs parallel with metal roofing system and each other for equipment mounting.

G. Pipe, Duct, or Conduit Mounting Curbs: Vertical posts, minimum 8 inches (400 mm) square unless otherwise indicated.

2.02 ROOF HATCHES AND VENTS

A. Roof Hatch Manufacturers:
   1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com/#sle.
   2. Acudor Products Inc: www.acudor.com/#sle.
   3. Babcock-Davis: www.babcockdavis.com/#sle.
   4. Best Access Doors: www.bestaccessdoors.com/#sle.
   5. Bilco Company: www.bilco.com/#sle.
   6. Dur-Red Products: www.dur-red.com/#sle.
   7. Elmdor: www.elmdor.com/#sle.
   8. FAKRO America LLC: www.fakrousa.com/#sle.
   9. LMCurbs: www.lmcurbs.com/#sle.
   10. Nystrom, Inc: www.nystrom.com/#sle.
   11. Precision Ladders, LLC: www.precisionladders.com/#sle.
   12. PS DOORS: www.psdoors.com/#sle.
   13. Surespan Limited: www.surespancovers.us/#sle.
   14. The Williams Brothers Corporation of America: www.wbdoors.com/#sle.
   15. Substitutions: See Section 016000 - Product Requirements.

2.03 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

A. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
   1. Design Loadings and Configurations: As required by applicable codes.
   2. Height: Provide minimum clearance of 6 inches (152 mm) under supported items to top of roofing.
   3. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   4. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
   5. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.
   6. Products:
      a. Garlock Safety Systems: www.garlocksafety.com/#sle.
      b. Green Link, Inc: www.greenlinkengineering.com/#sle.
      c. Metal Roof Innovations, Ltd. S-5! Attachment Solutions: www.s-5.com/#sle.
      d. PHP Systems/Design: www.phpsd.com/#sle.
      e. Substitutions: See Section 016000 - Product Requirements.

B. Pipe Supports: Provide attachment fixtures complying with MSS SP-58 and as indicated.
   1. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
   2. See relevant piping system specification section for additional requirements.

C. Non-Penetrating Pedestals: Steel pedestals with square, round, or rectangular bases.
   1. Bases: High density polypropylene.
   2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

2.04 SNOW GUARDS

A. Fence Type Snow Guard: Continuous snow guard; manufacturer's standard pipe, bar, channel, or solid rod, set in brackets or posts, with optional plates and metal trim to match roof.
   1. Solid Rod: Aluminum, mill finish.
      a. Outside Diameter: 3/8 inch (9.5 mm).
      b. Threaded Couplings: Aluminum, mill finish, manufacturers standard.

c. Ice Flags: Manufacturer's standard material.
d. End Collars and Caps: Manufacturer's standard material.

2. Supplemental Plates and Clips: Attached to horizontal component; match finish of pipe, tube, rod, or channel.
3. Clamps for Standing Seam Roof: Aluminum clamps attached to standing seams of roof panels; for attachment of fence type snow guard.
   a. Seam Profile: Selected by Architect from manufacturer's standard range; match profile of metal roof.
   b. Finish: Mill finish.
4. Products:
   a. **Alpine SnowGuards; ASG4025-AL Standing Seam Two-Pipe Snow Guard: www.alpinesnowguards.com/#sle. (Basis of Design)**
   b. Berger Building Products: www.bergerbp.com/#sle.
   c. Construction Metal Products, Inc: www.aceclamp.com/#sle.
   d. LMCurbs: www.lmcurbs.com/#sle.
   e. Metal Roof Innovations, Ltd. S-5! Attachment Solutions: www.s-5.com/#sle.
   f. PMC Industries, Inc: www.aceclamp.com/#sle.
   g. Rocky Mountain Snow Guards, Inc: www.rockymountainsnowguards.com/#sle.
   h. TRA Snow and Sun: www.trasnowandsun.com/#sle.
   i. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. See Section 077100 for information on roof specialties.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean installed work to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 077200

SECTION 078413
FIRE PROTECTION, HVAC & PLUMBING PENETRATION FIRESTOPPING

PART 1 GENERAL

1.01 SUMMARY

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

B. Section includes:

1. Through-penetration firestopping in fire rated construction.

2. Through-penetration smoke-stopping in smoke partitions.

C. Related items:

1. Fire dampers and manufactured devices: Refer to Division 23 Section HVAC Air Distribution.

1.02 REFERENCES

A. Underwriters Laboratories

1. UL Fire Resistance Directory

a. Through-penetration firestop devices (XHCR)
b. Fire resistance rating (BXUV)
c. Through-penetration firestop systems (XHEZ)
d. Fill, void, or cavity material (XHHW)

B. American Society for Testing and Materials Standards:

C. ASTM E 814-88: Standard Test Method for Fire Tests of Through-Penetration Firestops.

1.03 DEFINITIONS

A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.

B. Barriers: Time-rated fire walls, smoke barrier walls, time-rated ceiling/floor assemblies and structural floors.

C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses and smoke.

D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.

E. System: Specific products and applications, classified and numbered by Underwriters Laboratories, Inc. to close specific barrier penetrations.

F. Sleeve: Metal fabrication or pipe section extended through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in

other sections and may or may not be required.

1.04 SYSTEM DESCRIPTION

A. Design Requirements

1. Fire-rated construction: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations.

2. Smoke barrier construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations.

1.05 SUBMITTALS

A. Submit in accordance with Division 01 Section Submittal Procedures, unless otherwise indicated.

B. Product data: Manufacturer's specifications and technical data including the following:

1. Detailed specification of construction and fabrication.

2. Manufacturer's installation instructions.

C. Shop drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

1. Details of each proposed assembly identifying intended products and applicable UL system number, or UL classified devices.

2. Manufacturer or manufacturer's representative shall provide qualified engineering judgment and drawings relating to non-standard applications as needed.

D. Quality control submittals:

1. Statement of qualifications.

E. Applicators' qualifications statement:

1. List past projects indicating required experience.

1.06 QUALITY ASSURANCE

A. Installer's qualifications: Fire experienced in installation or application of systems similar in complexity to those required for this project, plus the following:

1. Acceptable to or licensed by manufacturer, State or local authority where applicable.

2. At least 2 years experience with systems.

3. Successfully completed at least 5 comparable scale projects using this system.

B. Local and State regulatory requirements: Submit forms or acceptance for proposed assemblies not conforming to specific UL Firestop System numbers, or UL classified

devices.

C. Materials shall have been tested to provide fire rating at least equal to that of the construction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping:

1. Deliver products in original unopened packaging with legible manufacturer's identification.

2. Coordinate delivery with scheduled installation date, allow minimum storage at site.

B. Storage and protection: Store materials in a clean, dry, ventilated location. Protect from soiling, abuse, moisture and freezing when required. Follow manufacturer's instructions.

1.08 PROJECT CONDITIONS

A. Existing condition:

1. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

2. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

B. Environmental requirements:

1. Furnish adequate ventilation if using solvent.

2. Furnish forced air ventilation during installation if required by manufacturer.

3. Keep flammable materials away from sparks or flame.

4. Provide masking and drop cloths to prevent contamination of adjacent surfaces by firestopping materials.

1.09 WARRANTY

A. Submit copies of written warranty agreeing to repair or replace joint sealers which fail in joint adhesion, extrusion resistance, migration resistance, or general durability or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated. The warranty period shall be two (2) years from date of substantial completion unless otherwise noted.

PART 2 PRODUCTS

2.01 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION

A. Systems of devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems or devices must be asbestos-

free.

1. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or device, and designed to perform this function.

2. Acceptable manufacturers and products.

   a. Those listed in the UL Fire Resistance directory for the UL System involved and as further defined in the System and Applications Schedule in Part 3.6 of this section.

3. All firestopping products must be from a single manufacturer. All trades shall use products from the same manufacturer unless otherwise noted.

2.02 SMOKE-STOPPING AT SMOKE PARTITIONS

A. Through-penetration smoke-stopping: Any system complying with the requirements for through-penetration firestopping in fire-rated construction, as specified in The Systems and Applications Schedule in Part 3.6 of this section, is acceptable, provided that the system includes the specified smoke seal or will provide a smoke seal. The length of time of the fire resistance may be disregarded.

2.03 ACCESSORIES

A. Fill, void or cavity materials: As classified under category XHHW in the UL Fire Resistance Directory.

B. Forming materials: As classified under category XHKU in the UL Fire Resistance Directory.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify barrier penetrations are properly sized and in suitable condition for application of materials.

2. Do not proceed until unsatisfactory conditions have been corrected.

B. Coordinate an inspection of all Mechanical Firestopping systems with the Fire Marshal prior to installation of ceilings, walls, etc.

3.02 PREPARATION

A. Clean surfaces to be in contact with penetration seal materials of dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting, adhesion, or the required fire resistance.

3.03 INSTALLATION

A. Install penetration seal materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's instruction.

B. Seal holes or voids made by penetrations to ensure an effective smoke barrier.

C. Protect materials from damage on surfaces subject to traffic.

D. When large openings are created in walls or floors to permit installation of pipes, ducts, or other items, close unused portions of opening with firestopping materials tested for the application. See UL Fire Resistance Directory or Section 3.6 of this document.

1. Install smoke stopping as specified for firestopping.

3.04 FIELD QUALITY CONTROL

A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Perform under this section patching and repairing of firestopping caused by cutting or penetration by other trades.

3.05 ADJUSTING AND CLEANING

A. Clean up spills of liquid components.

B. Neatly cut and trim materials as required.

C. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

3.06 SYSTEMS AND APPLICATION SCHEDULES*

PENETRATING ITEM	CONCRETE	GYPSUM	WOOD FLOOR/CEILING
Metal Pipe	CAJ1001 CP25S/L, CP25N/S CAJ1006 CS-195+, FS-195+ CAJ1007 FS-195+, 1-inch& 2-inch Wide CAJ1009 2000, 2000+, 2003 CAJ1010 2000, 2000+, 2003 CAJ1012 2000, 2000+, 2003 CAJ1013 2000, 2000+, 2003 CAJ1014 2000, 2000+, 2003 CAJ1015 2000, 2000+, 2003 CAJ1017 FD 150 CAJ1021 FD 150 CAJ1027 MPS-2+ CAJ1044 CP 25WB+ CAJ1052 CP 25S/L, CP 25N/S CAJ1058 2000, 2000+, 2003 CAJ1060 2000, 2000+, 2003 CAJ1063 2000, 2000+, 2003 CAJ1066 CP 25N/S,CP 25S/L, CP 25WB+ CAJ1091 CP 25N/S,CP 25S/L, CP 25WB+ CAJ1092 CP 25WB+ CAJ1112 FS-195+ CAJ1160 CP 25S/L, CP 25N/S CAJ1175 CP 25WB+ CAJ1176 CP 25WB+ CAJ1188 2000+ CBJ1020 CS-195+, FS-195+ CBJ1021 CS-195+, MPS-2+ CBJ1031 2001 CBJ1032 2001 FA1002 CP 25WB+ WJ1010 CP25WB+ WJ1023 2001	WL1001 CP 25 WL1002 FS-195+ WL1003 CP 25WB+,CP 25N/S WL1008 2000+ WL1009 2000+ WL1010 2000+ WL1016 CP 25WB+ WL1017 CP 25WB+,CP 25N/S WL1032 CP 25WB+,CP 25N/S WL1036 FD 150 WL1037 CS-195+,FS-195+ WL1067 CP 25N/S WL1073 CP 25WB+ WL1080 MPS2+ WL1082 2000+	FC1002 CP 25 FC1003 2000,2000+,20003 FC1006 CP 25WB+
Non-Metallic	CAJ2001 FS-195+, 1-inch& 2-inch WIDE, PPD'S CAJ2002 FS-195+ CAJ2003 CS-195+, FS-195+ CAJ2005 FS-195 CAJ2006 FS-195+ CAJ2013 FS-195+ CAJ2019 2000, 2000+, 2003 CAJ2027 FS-195+, CP 25N/S, CP 25S/L, CP 25WB+ CAJ2028 FS-195, MPS-2+ CAJ2029 FS-195+, PPD'S CAJ2030 CS-195+, FS-195+ CAJ2040 FS-195+, CP 25WB+ CAJ2044 FS-195+, CP 25N/S, CP 25S/L CP 25 WB+ CAJ2090 FS-195+ CAJ2177 FS-195+, PPD'S FA2001 FS-195+, PPD'S FS2002 CS-195+, FS-195+, MPS-2+, PPD'S FA2011 FS-195+ WJ2012 FS-195+ 1-inch WIDE	WL2002 FS-195+, PPD'S WL2003 FS-195+ WL2004 FS-195+ WL2005 FS-195+ 4' WIDE WL2006 FS-195+ WL2013 FS-195+ WL2031 CS-195+, FS-195+ WL2032 CS-195+, FS-195+ WL2033 FS-195+ WL2073 FS-195+ 1-inch WIDE	FC2002 FS-195+, PPD'S FC2007 FS-195+, PPD'S FC2008 FS-195+ FC2009 FS-195+, PPD'S FC2024 FS-195 FC2026 FS-195+ FC2028 FS-195, 1' & 2-inch WIDE, PPD'S

PENETRATING ITEM	CONCRETE	GYPSUM	WOOD FLOOR/CEILING
Insulated Metallic Pipe	CAJ5001 CP 25N/S, CP 25S/L, CP 25WB+ CAJ5002 FS-195+ CAJ5003 FS-195+ CAJ5005 MPS-2+ CAJ5009 2000+, 2003 CAJ5017 FS-195+, CP 25 CAJ5022 FS-195+ CAJ5024 FS-195+ CAJ5030 CS-195+, FS-195+ CAJ5041 2000, 2000+, 2003 CAJ5060 CP 25WB+ CAJ5074 2000+ CBJ5002 CP 25 CBJ5003 FS-195+ FA5001 FS-195+, CP 25WB+	WL5001 FS-195+ WL5002 FS-195+ WL5009 FS-195+ WL5010 FS-195+ WL5011 CP 25WB+ WL5032 2000+ WL5038 CP 25WB+ WL5039 CP 25WB+ WL5040 CP 25WB+ WL5045 CP 25WB+ WL5053 2000+	FC5002 FS-195+ FC5008 FS-195+
Miscellaneous Mechanical HVAC Ducts	CAJ7001 CP 25N/S CP 25S/L CAJ7003 CP 25WB+ CAJ7009 DUCT WRAP, BULK PUTTY		FC7001 CP 25S/L, CP 25N/S
Mixed Penetrating Items Combos	CAJ8001 CS-195+ FS-195 CAJ8003 2000, 2000+, 20003 CAJ8004 2000, 2000+, 20003 CAJ8006 2001 CAJ8013 FS-195+, CP 25 CBJ8004 CS-195, FS-195+ CBJ8005 CS-195+, MPS-2+ CBJ8008 2001 FA8001 FS-195+, CP 25WB+	WL8002 CS-195+, FS-195+	

*Underwriter's Laboratories, Inc., Fire Resistance Directory.

END OF SECTION 078413

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SECTION 079200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

C. Section 079100 - Preformed Joint Seals: Precompressed foam, gaskets, and strip seals.

D. Section 092116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

E. Section 093000 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).

B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).

C. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

E. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.

G. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.

H. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019 (Reapproved 2025).

I. SWRI (VAL) - SWR Institute Validated Products Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
2. List of backing materials approved for use with the specific product.
3. Backing material recommended by sealant manufacturer.
4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
5. Substrates the product should not be used on.
6. Substrates for which use of primer is required.
7. Substrates for which laboratory adhesion and/or compatibility testing is required.
8. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
9. Sample product warranty.

10. Certification by manufacturer indicating that product complies with specification requirements.
11. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

F. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

G. Installation Plan: Submit at least four weeks prior to start of installation.

H. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

I. Field Quality Control Plan: Submit at least two weeks prior to start of installation.

J. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

K. Installation Log: Submit filled-out log for each length or instance of sealant installed.

L. Field Quality Control Log: Submit filled-out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

M. Manufacturer's qualification statement.

N. Installer's qualification statement.

O. Executed warranty.

1.05 QUALITY ASSURANCE

A. Maintain one copy of each referenced document covering installation requirements on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

E. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
1. Adhesion Testing: In accordance with ASTM C794.
2. Compatibility Testing: In accordance with ASTM C1087.
3. Stain Testing: In accordance with ASTM C1248; required only for stone substrates.
4. Allow sufficient time for testing to avoid delaying the work.
5. Deliver sufficient samples to manufacturer for testing.
6. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
7. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

F. Installation Plan: Include schedule of sealed joints, including the following:
1. Joint width indicated in Contract Documents.

2. Joint depth indicated in Contract Documents; to face of backing material at centerline of joint.
3. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgment that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
4. Approximate date of installation, for evaluation of thermal movement influence.
5. Installation Log Form: Include the following data fields, with known information filled out.
    a. Unique identification of each length or instance of sealant installed.
    b. Location on project.
    c. Substrates.
    d. Sealant used.
    e. Stated movement capability of sealant.
    f. Primer to be used, or indicate no primer is used.
    g. Size and actual backing material used.
    h. Date of installation.
    i. Name of installer.
    j. Actual joint width; provide space to indicate maximum and minimum width.
    k. Actual joint depth to face of backing material at centerline of joint.
    l. Air temperature.

G. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
1. Identification of testing agency.
2. Name(s) of sealant manufacturer's field representatives who will be observing.
3. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
    a. Substrate; if more than one type of substrate is involved in a single joint, provide two entries on form, for testing each sealant substrate side separately.
    b. Test date.
    c. Location on project.
    d. Sealant used.
    e. Stated movement capability of sealant.
    f. Test method used.
    g. Date of installation of field sample to be tested.
    h. Date of test.
    i. Copy of test method documents.
    j. Age of sealant upon date of testing.
    k. Test results, modeled after the sample form in the test method document.
    l. Indicate use of photographic record of test.

H. Field Quality Control Plan:
1. Visual inspection of entire length of sealant joints.
2. Nondestructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
    a. If any failures occur in the first 10 linear feet (3 linear m), continue testing at 12 inches (305 mm) intervals at no extra cost to Owner.
3. Destructive field adhesion testing of sealant joints, except interior acrylic latex sealant.
    a. For each different sealant and substrate combination, allow for one test every 100 feet (30 m) in the first 1,000 linear feet (305 linear m), and one test per 1,000 linear feet (305 linear m) thereafter, or once per floor on each elevation.
    b. If any failures occur in the first 1,000 linear feet (305 linear m), continue testing at frequency of one test per 500 linear feet (152 linear m) at no extra cost to Owner.
4. Field testing agency's qualifications.

5. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.

I. Field Adhesion Test Procedures:
1. Allow sealants to fully cure as recommended by manufacturer before testing.
2. Have a copy of the test method document available during tests.
3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
6. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
7. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

J. Nondestructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Continuous Method.
1. Record results on Field Quality Control Log.
2. Repair failed portions of joints.

K. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
1. Sample: At least 18 inches (457 mm) long.
2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch (25.4 mm) by that percentage; if adhesion failure occurs before the 1-inch mark is that distance from the substrate, the test has failed.
3. If either adhesive or cohesive failure occurs before minimum elongation, take necessary measures to correct conditions and retest; record each modification to products or installation procedures.
4. Record results on Field Quality Control Log.
5. Repair failed portions of joints.

L. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or another applicable method as recommended by manufacturer.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants:
1. Adfast USA Inc: www.adfastcorp.com/#sle.
2. Adhesives Technology Corporation: www.atcepoxy.com/#sle.
3. Bostik Inc: www.bostik-us.com/#sle.
4. Dow: www.dow.com/#sle.
5. Everkem Diversified Products, Inc: www.everkemproducts.com/#sle.

6. Franklin International, Inc: www.titebond.com/#sle.
7. Henry, a Carlisle Company: www.henry.com/#sle.
8. Hilti, Inc: www.hilti.com/#sle.
9. Master Builders Solutions: www.master-builders-solutions.com/en-us/#sle.
10. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com/#sle.
11. Pecora Corporation: www.pecora.com/#sle.
12. QUIKRETE Companies: www.quikrete.com/#sle.
13. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
14. Sika Corporation: usa.sika.com/#sle.
15. Specified Technologies Inc: www.stifirestop.com/#sle.
16. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
17. W. R. Meadows, Inc: www.wrmeadows.com/#sle.
18. Substitutions: See Section 016000 - Product Requirements.

B. Self-Leveling Sealants:
1. Adhesives Technology Corporation: www.atcepoxy.com/#sle.
2. Bostik Inc: www.bostik-us.com/#sle.
3. Dayton Superior Corporation: www.daytonsuperior.com/#sle.
4. Dow: www.dow.com/#sle.
5. Master Builders Solutions: www.master-builders-solutions.com/en-us/#sle.
6. Pecora Corporation: www.pecora.com/#sle.
7. QUIKRETE Companies: www.quikrete.com/#sle.
8. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
9. Sika Corporation: usa.sika.com/#sle.
10. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
11. W. R. Meadows, Inc: www.wrmeadows.com/#sle.
12. Substitutions: See Section 016000 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
1. Exterior Joints:
   a. Seal open joints except open joints indicated on drawings as not sealed.
   b. Seal the following joints:
      1) Wall expansion and control joints.
      2) Joints between doors, windows, and other frames or adjacent construction.
      3) Joints between different exposed materials.
2. Interior Joints:
   a. Do not seal interior joints indicated on drawings as not sealed.
   b. Do not seal gaps and openings in gypsum board and suspended ceilings
   c. Do not seal through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
   d. Seal open joints except specific open joints indicated on drawings as not sealed.
   e. Seal the following joints:
      1) Joints between door frames and window frames and adjacent construction.
      2) Joints between different exposed materials.
3. Do Not Seal:
   a. Intentional weep holes in masonry.
   b. Joints indicated to be covered with expansion joint cover assemblies.
   c. Joints where sealant installation is specified in other sections.

B. Exterior Joints: Use nonsag nonstaining silicone sealant, unless otherwise indicated.
1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, noncuring.
2. Lap Joints between Manufactured Metal Panels: Butyl rubber, noncuring.

3. Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane traffic-grade sealant.

C. Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
1. Wall and Ceiling Joints in Nonwet Areas: Acrylic emulsion latex sealant.
2. Wall and Ceiling Joints in Wet Areas: Nonsag polyurethane sealant for continuous liquid immersion.

D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

E. Preformed Joint Seals: See Section 079100 for information.

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 016116.

B. Color: To be selected by Architect from manufacturer's full range.

2.04 NONSAG JOINT SEALANTS

A. Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M, A, G, and O; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
5. Color: To be selected by Architect from manufacturer's full range.
6. Service Temperature Range: Minus 20 to 180 degrees F (Minus 29 to 82 degrees C).

B. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's full range.
4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).

C. Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multicomponent; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface.
1. Movement Capability: Plus and minus 35 percent, minimum.
2. Water Compatibility: Non-Potable.
3. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
4. Color: To be selected by Architect from manufacturer's full range.
5. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).

D. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, nonstaining, nonbleeding, nonsagging; not intended for exterior use.
1. Color: To be selected by Architect from manufacturer's full range.
2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).

E. Noncuring Butyl Sealant: Solvent-based, single component, nonsag, nonskinning, nonhardening, nonbleeding; nonvapor permeable; intended for fully concealed applications.

2.05 SELF-LEVELING JOINT SEALANTS

A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
1. Movement Capability: Plus and minus 25 percent, minimum.

2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
3. Color: To be selected by Architect from manufacturer's full range.
4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).

2.06 ACCESSORIES

A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
3. Arrange for sealant manufacturer's technical representative to be present during tests.
4. Record each test on Preinstallation Adhesion Test Log as indicated.
5. If any sample fails, review products and installation procedures, consult manufacturer, or take other measures that are necessary to ensure adhesion; retest in a different location; if unable to obtain satisfactory adhesion, report to Architect.
6. After completion of tests, remove remaining sample material and prepare joints for new sealant installation.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
1. Width/depth ratio of 2:1.

2. Neck dimension no greater than 1/3 of the joint width.
3. Surface bond area on each side not less than 75 percent of joint width.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

C. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet (30 linear m), notify Architect immediately.

D. Destructive Adhesion Testing: If there are any failures in first 1,000 linear feet (300 linear m), notify Architect immediately.

E. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

F. Repair destructive test location damage immediately after evaluation and recording of results.

3.05 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

END OF SECTION 079200

SECTION 080671
DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section references specification sections relating to commercial door hardware for the following:

1. Swinging doors.
2. Sliding Doors.
3. Other doors to the extent indicated.

B. Commercial door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical and access control door hardware.
3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
4. Automatic operators.
5. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Door Hardware”.

D. Codes and References: Comply with the version adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.02 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.04 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.05 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.01 SCHEDULED DOOR HARDWARE

A. Refer to “PART 3 – EXECUTION” for required specification sections.

PART 3 - EXECUTION

3.01 DOOR HARDWARE SETS

A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.

1. Section 08 71 00 – Door Hardware.

C. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. SU - Securitron
4. RO - Rockwood
5. SA - SARGENT
6. NO - Norton Rixson
7. OT - Other

Hardware Sets

Set: 1.0

Doors: F104/2, F117/1, F118/1, F120/3

1	Continuous Hinge	CFM_HD1 x Length Required x PT		PE	087100
1	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Access Control Mort Lock	DG164 SN200-82271-24V BIPS-0E LNL (By Security Integrator)	US26D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100
1	Surface Closer w/Stop Arm	CPS7500	600x689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Door Sweep	3452CNB x Length Required		PE	087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE	087100
1	Power Supply	Provided by the Security Integrator		OT	
1	Door Position Switch	Provided by the Security Integrator		OT	
1	ElectroLynx Harness (door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (frame)	QC-C1500P		MK	087100
1	Latch Protector	321	US32D	RO	087100

Notes: Operational Narrative:
1. Door normally closed and secure.
2. Authorized access by card reader unlocking lever trim for a predetermined time limit. Trim can remain unlocked for open access.
3. Egress free for immediate exit.
4. Mortise lock REX switch allows authorized exit without alarm condition.
5. Door position switch monitors open/closed status.
6. Lever remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 2.0

Doors: F103/2, F112/3

1	Continuous Hinge	CFM_HD1 x Length Required x PT		PE	087100
1	Continuous Hinge	CFM_HD1-M x Length Required		PE	087100
1	Electric Power Transfer	EL-CEPT	630	SU	087100
2	Manual Flush Bolt	555 / 557 (As Required x Extended Top Rod as Required	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Access Control Mort Lock	DG164 SN200-82271-24V BIPS-0E LNL (By Security Integrator)	US26D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100
2	Surface Closer w/Stop Arm	CPS7500	600x689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Astragal	Provided by the Door Supplier		OT	
1	Gasketing	303AS (Head & Jambs)		PE	087100
2	Door Sweep	3452CNB x Length Required		PE	087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE	087100
1	Power Supply	Provided by the Security Integrator		OT	
2	Door Position Switch	Provided by the Security Integrator		OT	
1	ElectroLynx Harness (door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (frame)	QC-C1500P		MK	087100

Set: 3.0

Doors: F112/1, F113/1, F113/2, F115/1, F116/1, F116/3

2	Continuous Hinge	CFM_HD1 x Length Required x PT		PE	087100
2	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Concealed Vert Rod Exit	DG164 SN200-MD8674 BIPS-0E 106 x ETL (By Security Integrator)	US32D	SA	087100
1	Concealed Vert Rod Exit, Exit Only	55 MD8610 EO	US32D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100
2	Surface Closer w/Stop Arm	CPS7500	600x689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Astragal	18061CNB TKSP x Length as required)		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
2	Door Sweep	3452CNB x Length Required		PE	087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE	087100
1	Power Supply	Provided by the Security Integrator		OT	
2	Door Position Switch	Provided by the Security Integrator		OT	
2	ElectroLynx Harness (door)	QC-C**** x Length Required		MK	087100
2	ElectroLynx Harness (frame)	QC-C1500P		MK	087100

Notes: Operational Narrative:
1. Doors normally closed and secure.
2. Authorized access by card reader unlocking lever trim for a predetermined time limit. Trim can remain unlocked for open access.
3. Egress free for immediate exit.
4. Exit device REX switch allows authorized exit without alarm condition.
5. Door position switch monitors open/closed status.
6. Lever remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 4.0

Doors: F100/1, F100/2

2	Continuous Hinge	CFM_SLF-HD1 x Length Required x PT		PE	087100
2	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Concealed Vert Rod Exit	DG164 SN200-MD8674 BIPS-0E 106 x ETL (By Security Integrator)	US32D	SA	087100
1	Concealed Vert Rod Exit, Exit Only	55 MD8610 EO	US32D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100
2	Conc Overhead Stop	6-X36	630	NO	087100
2	Surface Closer	PR7500	600x689	NO	087100
2	Drop Plate	7788	689	NO	087100
2	Blade Stop Spacer	6891	689	NO	087100
1	Gasketing	Provided by Aluminum Frame Supplier		OT	
2	Door Sweep	3452CNB x Length Required		PE	087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE	087100
1	Power Supply	Provided by the Security Integrator		OT	
2	Door Position Switch	Provided by the Security Integrator		OT	
2	ElectroLynx Harness (door)	QC-C**** x Length Required		MK	087100
2	ElectroLynx Harness (frame)	QC-C1500P		MK	087100

Notes: Operational Narrative:
1. Doors normally closed and secure.
2. Authorized access by card reader unlocking lever trim for a predetermined time limit. Trim can remain unlocked for open access.
3. Egress free for immediate exit.
4. Exit device REX switch allows authorized exit without alarm condition.
5. Door position switch monitors open/closed status.
6. Lever remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 5.0

Doors: F114/1, F114/2, F114/3

1	Continuous Hinge	CFM_HD1 x Length Required x PT		PE	087100
1	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Rim Exit Device	DG164 SN200-8876 BIPS-0E ETL (By Security Integrator)	US32D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100
1	Surface Closer	PR7500	600x689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Door Sweep	315CN x Length Required		PE	087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE	087100
1	Power Supply	Provided by the Security Integrator		OT	
1	Door Position Switch	Provided by the Security Integrator		OT	
1	ElectroLynx Harness (door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (frame)	QC-C1500P		MK	087100

Notes: Operational Narrative:
1. Door normally closed and secure.
2. Authorized access by card reader unlocking lever trim for a predetermined time limit. Trim can remain unlocked for open access.
3. Egress free for immediate exit.
4. Exit device REX switch allows authorized exit without alarm condition.
5. Door position switch monitors open/closed status.
6. Lever remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 6.0

Doors: F114/6, F119/1, F120/1

3	Hinge, Full Mortise	T4A3786 [NRP]	US26D	MK	087100
1	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Access Control Mort Lock	DG164 SN200-82271-24V BIPS-0E LNL (By Security Integrator)	US26D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100
1	Surface Closer w/Stop Arm	CPS7500	600x689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608-RKW		RO	087100
1	Power Supply	Provided by the Security Integrator		OT	
1	Door Position Switch	Provided by the Security Integrator		OT	
1	ElectroLynx Harness (door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (frame)	QC-C1500P		MK	087100

Notes: Operational Narrative:
1. Door normally closed and secure.
2. Authorized access by card reader unlocking lever trim for a predetermined time limit. Trim can remain unlocked for open access.
3. Egress free for immediate exit.
4. Mortise lock REX switch allows authorized exit without alarm condition.
5. Door position switch monitors open/closed status.
6. Lever remains locked (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 7.0

Doors: F101/1, F102/1, F104/1

1 Continuous Hinge	CFM_HD1-M x Length Required		PE 087100
1 Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Surface Closer	7500 (PA or RA as required)	689	NO 087100
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
1 Gasketing	S44BL (Head & Jambs)		PE 087100
1 Door Sweep	315CN x Length Required		PE 087100
1 Threshold	151A x Length Required x MSES25SS		PE 087100

Set: 8.0

Doors: F106/1, F107/1, F121/1, F123/1

1 Continuous Hinge	CFM_HD1-M x Length Required		PE 087100
1 Public Toilet Deadlock	DG164 4878	US26D	SA 087100
2 Keyed Core	DG1 6300	US15	SA 087100
1 Pull Plate	BF 110x70C CFC	US32D	RO 087100
1 Push Plate	70C-RKW CFTT CFC	US32D	RO 087100
1 Surface Closer	PR7500	600x689	NO 087100
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
1 Gasketing	303AS (Head & Jambs)		PE 087100
1 Door Sweep	315CN x Length Required		PE 087100
1 Threshold	151A x Length Required x MSES25SS		PE 087100

Set: 9.0

Doors: F108/1, F122/1

1	Continuous Hinge	CFM_HD1-M x Length Required		PE 087100
1	Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1	Keyed Core	DG1 6300	US15	SA 087100
1	Surface Closer	7500 (PA or RA as required)	689	NO 087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1	Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
1	Gasketing	S44BL (Head & Jambs)		PE 087100
1	Door Sweep	315CN x Length Required		PE 087100
1	Threshold	151A x Length Required x MSES25SS		PE 087100

Set: 10.0

Doors: B100/1, B101/1, C102/1, C104/1

1	Continuous Hinge	CFM_HD1-M x Length Required		PE 087100
1	Public Toilet Deadlock	DG164 4878	US26D	SA 087100
2	Keyed Core	DG1 6300	US15	SA 087100
1	Pull Plate	BF 110x70C CFC	US32D	RO 087100
1	Push Plate	70C-RKW CFTT CFC	US32D	RO 087100
1	Surface Closer w/Stop Arm	CPS7500	600x689	NO 087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1	Gasketing	303AS (Head & Jambs)		PE 087100
1	Door Sweep	3452CNB x Length Required		PE 087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE 087100

Set: 11.0

Doors: B102, C100/1, C105/1

1	Continuous Hinge	CFM_HD1-M x Length Required		PE	087100
1	Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100
1	Surface Closer w/Stop Arm	CPS7500	600x689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Door Sweep	3452CNB x Length Required		PE	087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE	087100
1	Latch Protector	321	US32D	RO	087100

Set: 12.0

Doors: M107/1, M107/3

1	Continuous Hinge	CFM_HD1-M x Length Required		PE	087100
1	Rim Exit Device, Classroom	DG164 8813 ETL	US32D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100
1	Surface Closer w/Stop Arm	CPS7500	600x689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Door Sweep	3452CNB x Length Required		PE	087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE	087100

Set: 13.0

Doors: M100/1

1	Continuous Hinge	CFM_HD1-M x Length Required		PE 087100
1	Classroom Lock	DG164 8237 LNL	US26D	SA 087100
1	Keyed Core	DG1 6300	US15	SA 087100
1	Surface Closer w/Stop Arm	CPS7500	600x689	NO 087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1	Gasketing	303AS (Head & Jambs)		PE 087100
1	Door Sweep	3452CNB x Length Required		PE 087100
1	Threshold	278x292AFGT x Length Required x MSES25SS		PE 087100
1	Latch Protector	321	US32D	RO 087100

Set: 14.0

Doors: F114/4, F115/5, F117/2, F118/2, M103/1

3	Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1	Privacy Lock (w/Indicator)	V21 8265 LNL	US26D	SA 087100
1	Mop Plate	K1050 6" high CSK BEV	US32D	RO 087100
1	Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3	Silencer	608-RKW		RO 087100

Set: 15.0

Doors: M106/1

3	Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1	Privacy Lock (w/Indicator)	V21 8265 LNL	US26D	SA 087100
1	Surface Closer w/Stop Arm	CPS7500	600x689	NO 087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
3	Silencer	608-RKW		RO 087100

Set: 16.0

Doors: F107/2, F118/3, F123/2

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Mortise Deadlock	DG164 4875	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Cylinder Pull	90	US32D	RO 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 17.0

Doors: F115/6

2 Hinge, Spring	1502 4-1/2" x 4-1/2"	US26D	MK 087100
1 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 18.0

Doors: F105/1

2 Continuous Hinge	CFM_HD1-M x Length Required		PE 087100
2 Manual Flush Bolt	555 / 557 (As Required x Extended Top Rod as Required	US26D	RO 087100
1 Dust Proof Strike	570	US26D	RO 087100
1 Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
2 Surface Closer w/Hold Open Stop Arm	CPS7500T	600x689	NO 087100
2 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1 Astragal	Provided by the Door Supplier		OT
2 Silencer	608-RKW		RO 087100

Set: 19.0

Doors: F112/2, F115/4, C101/1

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Surface Closer	7500 (PA or RA as required)	689	NO 087100
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 20.0

Doors: F114/5, F114/7

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 21.0

Doors: F115/2

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Store Door Lock	DG164 8226 LNL	US26D	SA 087100
2 Keyed Core	DG1 6300	US15	SA 087100
1 Surface Closer	7500 (PA or RA as required)	689	NO 087100
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 22.0

Doors: F115/3

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Classroom Lock	DG164 8237 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Surface Closer	7500 (PA or RA as required)	689	NO 087100
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 23.0

Doors: F120/2

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Office/Entry Lock	DG164 8205 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 24.0

Doors: M101/1

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Office/Entry Lock	DG164 8205 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Surface Closer	7500 (PA or RA as required)	689	NO 087100
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 25.0

Doors: F116/2

2 Continuous Hinge	CFM_HD1-M x Length Required		PE 087100
2 Concealed Vert Rod Exit, Classroom	DG164 NB MD8613 ETL	US32D	SA 087100
2 Keyed Core	DG1 6300	US15	SA 087100
2 Surface Closer w/Hold Open	PR7500H	689	NO 087100
2 Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
2 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
2 Silencer	608-RKW		RO 087100

Set: 26.0

Doors: M104/1

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Door Stop	403 (or) 441CU (As Condition Requires)	US26D	RO 087100
3 Silencer	608-RKW		RO 087100

Set: 27.0

Doors: M102/1

3 Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1 Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1 Keyed Core	DG1 6300	US15	SA 087100
1 Conc Overhead Stop	6-X36	630	NO 087100
3 Silencer	608-RKW		RO 087100

Set: 28.0

Doors: M100/2

3	Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1	Classroom Lock	DG164 8237 LNL	US26D	SA 087100
1	Keyed Core	DG1 6300	US15	SA 087100
1	Surface Closer w/Stop Arm	CPS7500	600x689	NO 087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1	Gasketing	303AS (Head & Jambs)		PE 087100
1	Door Sweep	315CN x Length Required		PE 087100
1	Threshold	151A x Length Required x MSES25SS		PE 087100

Set: 29.0

Doors: M105/1

6	Hinge, Full Mortise	TA2714-MCK [NRP]	US26D	MK 087100
1	Automatic Flush Bolt (Set)	2842 / 2962 (As Required)	US26D	RO 087100
1	Dust Proof Strike	570	US26D	RO 087100
1	Storeroom/Closet Lock	DG164 8204 LNL	US26D	SA 087100
1	Keyed Core	DG1 6300	US15	SA 087100
1	Coordinator	2600 Series x Mounting Brackets As Required	Black	RO 087100
2	Surface Closer w/Stop Arm	CPS7500	600x689	NO 087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO 087100
1	Astragal	Provided by the Door Supplier		OT
2	Silencer	608-RKW		RO 087100

Set: 30.0

Doors: 000/1, 000/2, 000/3, 000/4, 000/5, 000/6,104/3, 104/4, 114/8, 114/9, C100, M107/2, M108/1, M109/1, M110/1, M111/1, M112/1

1	Keyed Core	DG1 6300	US15	SA 087100

Notes: Provide core/cylinder as directed by architect. Coordinate locking requirements w/ specialty door supplier.

Set: 31.0

Doors: 000/7, 000/8

1	Rim Exit Device, Classroom	DG164 WH PE8813 NEL	US32D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100

Notes: Balance of hardware to be provided by the gate supplier.

Set: 32.0

Doors: 000/9

1	Classroom Lock	DG164 10XG37 LL	US26D	SA	087100
1	Keyed Core	DG1 6300	US15	SA	087100

END OF SECTION 080671

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SECTION 081113
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "General Conditions”.
2. Division 04 Section "Masonry".
3. Division 06 Section “Rough Carpentry”.
4. Division 06 Section “Finish Carpentry”.
5. Division 08 Section “Operations and Maintenance”.
6. Division 08 Section “Flush Wood Doors”.
7. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
8. Division 08 Section "Glazing".
9. Division 08 Section "Door Hardware”.
10. Division 09 Sections "Painting".
11. Division 26 Section "Electrical”

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. SDI-113 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door & Frame Assemblies.

10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
11. ASTM C1199 - Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
12. ASTM E1423 - Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.
13. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
14. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
15. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
16. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
17. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
18. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
19. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40” above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.

    a. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.07 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:

1. CECO Door Products (C).
2. Curries Company (CU).

2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.03 HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.

1. Design: Flush panel.
2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds or thermally enhanced stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 “Laminated Core”.

a. Provide 22-gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
b. Thermal properties to rate at a fully operable minimum U-Factor 0.34 and R-Value 2.92, including insulated door, thermal-break frame and threshold.
c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.38 and R-Value 2.6, including insulated door, kerf type frame, and threshold.

3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053 inch - 1.3-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.

a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Manufacturers Basis of Design:

1. CECO Door Products (C) Polystyrene Core - Legion Series.
2. CECO Door Products (C) Energy Efficient - Trio-E Series.

2.04 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.

C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
3. Manufacturers Basis of Design:

    a. CECO Door Products (C) - SU SR Series.
    b. CECO Door Products (C) - Mercury 3 Thermal Break TQB Series.

D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Manufacturers Basis of Design:

    a. CECO Door Products (C) - BU DU Series.
    b. CECO Door Products (C) - SU Series.

E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.05 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.06 LOUVERS

A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.07 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.

1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.08 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.09 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.

2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld joints continuously through full throat width of frames, including rabbets, soffits, and stops; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.010 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

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

3.02 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.03 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

    a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.04 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.05 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 081113

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SECTION 081416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; non-rated.

1.02 RELATED REQUIREMENTS

A. Section 081113 - Hollow Metal Doors and Frames.

B. Section 087100 - Door Hardware.

C. Section 088000 - Glazing .

D. Section 092116 - Gypsum Board Assemblies: Bullet-resistant sheathing and wallboard for bullet-resistant partitions and walls.

1.03 REFERENCE STANDARDS

A. AWI (QCP) - Quality Certification Program; Current Edition.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
   1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

D. Samples: Submit two samples of door construction, 6 by 6 inches (152.4 by 152.4 mm) in size cut from top corner of door.

E. Samples: Submit two samples of door veneer, 8 by 10 inches (203.2 by 254 mm) in size illustrating wood grain, stain color, and sheen.

F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

G. Manufacturer's Installation Instructions: Indicate special installation instructions.

H. Manufacturer's qualification statement.

I. Installer's qualification statement.

J. Specimen warranty.

K. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than 5 years of documented experience.
   1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

D. Woodwork Quality Assurance Program:

1. Comply with AWI (QCP) woodwork association quality assurance service/program in accordance with requirements for work specified in this section; www.awiqcp.org/#sle.
2. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
3. Provide designated labels on shop drawings as required by quality assurance program.
4. Provide designated labels on installed products as required by quality assurance program.
5. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.
   1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Forte Opening Solutions: www.forteopenings.com/#sle.
   2. Haley Brothers: www.haleybros.com/#sle.
   3. Horton Automatics, a division of Overhead Door Corporation: www.overheaddoor.com/#sle.
   4. Krieger Specialty Products: www.kriegerproducts.com/#sle.
   5. Lynden Door, Inc: www.lyndendoor.com/#sle.
   6. Oregon Door: www.oregondoor.com/#sle.
   7. Vancouver Architectural Doors: vancouverdoorco.com/#sle.
   8. VT Industries, Inc: www.vtindustries.com/#sle.
   9. Substitutions: See Section 016000 - Product Requirements.

2.02 DOORS

A. Doors: See drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Species as selected by Architect, veneer grade in accordance with quality standard indicated, cut/slice as selected by Architect, with matching as selected by Architect between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

1. Vertical Edges: Same species as face veneer.
2. "Running Match" each pair of doors and doors in close proximity to each other.
3. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet (3 m) of each other when doors are closed.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

F. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Stain: As selected by Architect.
      c. Sheen: Satin.

B. Factory finish doors in accordance with approved sample.

C. Seal door top edge with color sealer to match door facing.

2.07 ACCESSORIES

A. Hollow Metal Door Frames: See Section 081113.

B. Glazing: See Section 088000.

C. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

F. Install door louvers plumb and level.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION 081416

SECTION 083100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall-mounted access units.

1.02 RELATED REQUIREMENTS

A. Section 099000 - Paints and Coatings: Field paint finish.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

D. Samples: Submit two access units, 12 by 12 inches (304.8 by 304.8 mm) in size indicating frame configuration.

E. Manufacturer's Installation Instructions: Indicate installation requirements.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Project Record Documents: Record actual locations of each access unit.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

A. Wall-Mounted Units:
   1. Panel Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
   2. Size: 12 by 12 inches (305 by 305 mm).
   3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
   4. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
   5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
   6. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.

B. Wall-Mounted Units in Wet Areas:
   1. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
   2. Size: 12 by 12 inches (305 by 305 mm).
   3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
   4. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
   5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
   6. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.

C. Ceiling-Mounted Units:

1. Panel Material: Aluminum extrusion with gypsum board inlay.
2. Size - Lay-In Grid Ceilings: To match module of ceiling grid.
3. Size - Other Ceilings: 12 by 12 inches (305 by 305 mm).
4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.02 WALL- AND CEILING-MOUNTED ACCESS UNITS

A. Manufacturers:
1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com/#sle.
2. ACUDOR Products Inc: www.acudor.com/#sle.
3. Babcock-Davis: www.babcockdavis.com/#sle.
4. BAUCO Access Panel Solutions Inc: www.bauco.com/#sle.
5. Best Access Doors: www.bestaccessdoors.com/#sle.
   a. Recessed Access Panel: Best Access Doors; Series BA-AHA.
   b. Recessed Access Panel: Best Access Doors; Series BA-RHF.
   c. Large Opening Access Panel: Best Access Doors; Series BA-HHD-110.
6. Cendrex, Inc: www.cendrex.com/#sle.
   a. Heavy Duty Access Door Units for Large Openings: Cendrex HHD-180-220 Heavy-Duty Double Leaf Access Door with Exposed Flange.
7. Elmdor: www.elmdor.com/#sle.
8. FF Systems, Inc: www.ffsystemsinc.com/#sle.
9. Fire-End & Croker Corporation: www.croker.com/#sle.
10. Karp Associates, Inc: www.karpinc.com/#sle.
11. MIFAB, Inc: www.mifab.com/#sle.
12. Nystrom, Inc: www.nystrom.com/#sle.
13. Studco Building Systems: www.studcosystems.com/#sle.
14. The Williams Brothers Corporation of America: www.wbdoors.com/#sle.
15. Substitutions: See Section 016000 - Product Requirements.

B. Wall- and Ceiling-Mounted Units: Factory-fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
1. Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
2. Style: Exposed frame with door surface flush with frame surface.
3. Door Style: Single thickness with rolled or turned in edges.
4. Heavy-Duty Frames: 14-gauge, 0.0747-inch (1.89 mm) minimum thickness.
5. Heavy-Duty Single Steel Sheet Door Panels: 14-gauge, 0.0747-inch (1.89 mm) minimum thickness.
6. Steel Finish: Primed.
7. Door/Panel Size: As scheduled.
8. Hardware:
   a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
   b. Latch/Lock: Tamperproof tool-operated cam latch.
   c. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to proceeding with this work.

B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION 083100

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SECTION 083300
INSULATED ROLLING COUNTER SHUTTERS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Electric operated rolling counter doors.

B. Related Sections:
   1. 055000 Metal Fabrications. Door opening jamb and head members.
   2. 061053 - Miscellaneous Rough Carpentry. Door opening jamb and head members.
   3. 083100 Access Doors and Panels. Access doors.
   4. 087000 Hardware. Padlocks. Masterkeyed cylinder.
   5. 099100 Painting. Field painting.
   6. Division 26. Electrical wiring and conduit, fuses, disconnect switches, connection of operator to power supply, and installation of control station and wiring.

C. Products That May Be Supplied, But Are Not Installed Under This Section:
   1. Control Station.

1.02 REFERENCE STANDARDS

A. ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test; 2022.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

C. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

D. ISO 9001 - Quality Management Systems — Requirements; 2015, with Amendment (2024).

E. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Reference Section 01 33 00 Submittal Procedures; submit the following items:
   1. Product Data.
   2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
   3. Quality Assurance/Control Submittals:
      a. Provide manufacturer ISO 9001:2015 registration.
      b. Provide manufacturer and installer qualifications - see below.
      c. Provide manufacturer's installation instructions.
      d. Provide manufacturer’s Health Product Declaration (HPD) for each product.
   4. Closeout Submittals:
      a. Operation and Maintenance Manual.
      b. Certificate stating that installed materials comply with this specification.

1.04 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing counter doors of the type specified.
   2. Installer Qualifications: Manufacturer’s approval.

1.05 DELIVERY STORAGE AND HANDLING

A. Reference Section 01 66 00 Product Storage and Handling Requirements.

B. Follow manufacturer’s instructions.

1.06 WARRANTY

A. Standard Warranty: Two years from date of shipment against defects in material and workmanship.

B. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Manufacturer:
1. C.H.I. Overhead Doors: www.chiohd.com/#sle.
2. Clopay Building Products: www.clopaydoor.com/#sle.
3. Cookson: www.cooksondoor.com/.
4. **Cornell: www.cornellirn.com/. (Basis of Design)**
5. Wayne-Dalton, a Division of Overhead Door Corporation[<>]: www.wayne-dalton.com/#sle
6. Substitutions: See Section 016000 - Product Requirements.

2.02 PRODUCT INFORMATION

A. Model: ESC30.

2.03 MATERIALS

A. Curtain:
1. Slat Configuration:
a. Galvanized Steel with Finish as Described Below: No. 1F, interlocked flat-faced slats, 1-1/2 inches (38 mm) high by 1/2 inch (12.7 mm) deep, minimum 22 gauge ASTM A 653, Commercial Quality, galvanized steel with extruded tubular aluminum bottom bar with continuous lift handle and vinyl astragal. Gray PVC backer slat.
b. Insulation: 3/8 inch (9.52 mm) open cell melamine.
c. Total Slat Thickness: .545 inch (13.84 mm).
d. Flame Spread Index of 15 and a Smoke Developed Index of 450 as tested per ASTM E84.
e. R-value: 2.0.
f. U-Factor: .88.
g. STC Rating: Up to 26 for the entire assembly, as tested per ASTM E90 and based on testing a complete, operable assembly.
2. Finish:
a. SpectraShield® Coating System (Color Selected by Architect):
1) SpectraShield color as selected by Architect from manufacturer's color range, more than 180 colors.

B. Endlocks:
1. Fabricate interlocking slat sections stamped steel endlocks riveted to ends of alternate slats.

C. Guides:
1. Fabrication:
a. Aluminum: Heavy duty extruded aluminum sections with snap-on cover to conceal fasteners. Provide polypropylene pile runners on both sides of curtain to eliminate metal to metal contact between guides and curtain.
2. Finish:
a. SpectraShield® Coating System (Color Selected by Architect): Zirconium treatment followed by baked-on polyester powder coat, color as selected by Architect from manufacturer's standard color range, over 180 colors; minimum 2.5 mils [0] inch ([0.06] mm) cured film thickness; ASTM D3363 pencil hardness: H or better.

D. Shaft Assembly:
1. Tube Motor Shaft Assembly:

a. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of [0.03] inches ([0.76] mm) per foot ([0.1] inch ([2.5] mm) per meter) of width.

E. Brackets:
1. Fabricate from reinforced steel plate with bearings at rotating support points to support counterbalance shaft assembly and form end closures.
2. Finish:
a. SpectraShield® Coating System (Color Selected by Architect): Zirconium treatment followed by baked-on polyester powder coat, color as selected by Architect from manufacturer's standard color range, over 180 colors; minimum 2.5 mils {CH#10751064} cured film thickness; ASTM D3363 pencil hardness: H or better.

F. Hood:
1. Minimum 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum {CH#10751066} steel intermediate support brackets.
2. Finish:
a. SpectraShield® Coating System (Color Selected by Architect):
1) Zirconium treatment followed by baked-on polyester powder coat, with color as selected by Architect from manufacturer's standard color range, over 180 colors; minimum 2.5 mils {CH#10751067} cured film thickness; ASTM D3363 pencil hardness: H or better.

2.04 OPERATION

A. Motor - Electric Tube Motor Operator: Rated for a maximum of 5 cycles per hour, UL 325 listed, rated (50 ft-bl/sec) (100 ft-bl/sec) or (150 ft-bl/sec) as recommended by door manufacturer for size and type of door, 120 Volts, 1 Phase. Provide complete with electric tube motor, maintenance free electric brake, emergency manual crank hoist and control station(s). Motor shall be protected against overload with an auto-reset thermal sensing device. Operator shall be equipped with an emergency manual crank hoist assembly that safely cuts operator power when engaged. A disconnect chain shall not be required to engage or release the manual crank hoist. Electronic limit switch required. The electrical contractor shall mount the control station(s) and supply all conduit and wiring per the overhead door wiring instructions.

B. Control Station: For use with motor operated units only.
1. Surface mounted: "Open/Close/Stop" push buttons; NEMA 1
2. Flush mounted: "Open/Close" key switch with small format Best type 7-pin cylinder; NEMA 1B.

C. Control Operation:
1. Momentary contact to close:
a. Fail-safe, UL 325-2010 Compliant Entrapment Protection for Model MG Motor Operation.
b. Smartsync Wireless Edge Kit – continuously monitored, wireless sensing/weather edge seal extending full width of door bottom bar. Contact before door fully closes shall cause door to immediately stop downward travel and reverse direction to the fully opened position. Wireless edge kit will use Zigbee wireless technology. Radio band wireless sensing edges will not be permitted.

2.05 ACCESSORIES

A. Countertop:
1. Stainless steel 14 gauge type 304 #4 finish: Rectangular shape design for between jambs mounted unit of size and configuration for opening size and wall construction.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

3.02 INSTALLATION

A. Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports.

B. Follow manufacturer's installation instructions.

3.03 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion

3.04 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer

B. Remove surplus materials and debris from the site

3.05 DEMONSTRATION

A. Demonstrate proper operation to Owner's Representative

B. Instruct Owner's Representative in maintenance procedures

END OF SECTION 083300

SECTION 083600
SECTIONAL OVERHEAD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush insulated steel sandwich sectional overhead door.

B. Electric Door Operators.

1.02 RELATED SECTIONS

A. 033000 - Cast-In-Place Concrete.

B. 042000 - Unit Masonry Assemblies.

C. 055000 - Metal Fabrications.

D. 061053 - Miscellaneous Rough Carpentry.

E. 079000 - Joint Seals.

F. 087100 - Door Hardware and locks.

G. 099000 - Paints and Coatings.

H. 160500 - Electrical service and connections for powered operators.

1.03 REFERENCES

A. ASTM B 653/653M.

B. ASTM B 209/209M.

C. ASTM B221/221M.

D. AAMA 2604.

E. DASMA TDS-163.

F. ANSI/DASMA 102.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Operation and maintenance data.
   5. Nameplate data and ratings for motors.

C. Shop Drawings: Include opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

D. Selection Samples: Upon request furnish color samples or 2’ X 2’ section sample.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum ten years of documented experience.

B. Installer Qualifications: Minimum five years of documented experience, and authorized by the door manufacturer.

1.06 WARRANTY

A. Manufacturers Limited Warranty steel sectional overhead doors.
   1. Standard finish warranty against cracking, checking, or peeling for 10 years.
   2. Custom color option Color Blast Finish limited warranty period for 5 years.
   3. Delamination warranty for 10 years; Parts and Hardware for 1 year. Extended 8-Year Hardware Warranty option.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer:
1. C.H.I. Overhead Doors: www.chiohd.com/#sle.
2. **Clopay Building Products; Model 3722: www.clopaydoor.com/#sle. (Basis of Design)**
3. Cookson: www.cooksondoor.com/.
4. Wayne-Dalton, a Division of Overhead Door Corporation[<>]: www.wayne-dalton.com/#sle
5. Substitutions: See Section 016000 - Product Requirements.

2.02 FLUSH STEEL DOORS, THERMALLY-BROKEN, POLYURETHANE INSULATED

A. Door Construction:
1. Panels: Foamed in place Polyurethane core construction between exterior and interior steel skins.
2. Steel Skins: Formed from roll formed commercial or drawing quality steel sheet, hot-dip galvanized per ASTM A924/A924M and ASTM A653/A653M, pre-painted with primer and baked-on polyester topcoat; sections formed to create weather tight tongue-in-groove meeting joint.
3. Reinforcing: Galvanized and primed steel reinforcement located under each hinge location, pre-punched for hinge attachment.

B. Premium Duty 2-inches Door: Clopay Model 3722
1. Style: Flush steel doors, thermally-broken, polyurethane insulated.
2. Overall Panel Thickness: 2-inches.
3. Steel Skin Thickness: Minimum 20 gauge 0.034 inch (0.86 mm) exterior; minimum 27 gauge 0.016 inch (0.41 mm) interior.
4. End Stiles: Galvanized steel end stiles, engineered for easy hardware attachment through pre-punched holes. Minimum 18 gauge, 0.045 inch (1.14 mm) thick for single end hinge style and 16 gauge .056 inch (1.42 mm) minimum for double end hinge style.
5. Astragal: U-shaped flexible PVC in retainer of full-length 0.055 inch (1.4 mm) rigid PVC.
6. Thermal Resistance (R-value): 18.4 degrees Fahrenheit (-7.56 degrees Celsius) hr sq ft/Btu; calculated door section R-value in accordance with DASMA TDS-163.
    a. Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated.
7. IECC: ASTM E283-12 and ANSI/DASMA 105-2012.
    a. U-Factor: 0.16.
    b. Air Infiltration: .022 cfm @ 25 mph.
8. Finish: Flush stucco embossed texture ,white interior color, exterior as follows:
    a. As selected by Architect from manufacturer's full range.
9. Weatherstripping: Provide complete perimeter seals. Provide flexible top seal, flexible jamb seal and U shaped bottom seal.
10. Tracks: Vertical tracks minimum 0.061 inch (1.55 mm) galvanized steel tapered and mounted for wedge type closing. Horizontal tracks minimum 0.075 inch (1.9 mm) galvanized steel, reinforced with minimum 0.0897 inch (2.28 mm) galvanized steel angles as required:
    a. Track Width: 2” track as indicated.
    b. Provide high lift with follow the roof pitch as indicated on drawings.
11. Spring Counterbalance: Torsion spring counterbalance mechanism sized to weight of the door, with with high strength galvanized aircraft cable with minimum 7 to 1 safety factor
    a. Standard Cycle Spring: 10,000 cycle
12. Shaft: Provide extended shaft for motor operation
13. Windload: Provide W4 wind code, comply with local building requirements.

2.03 ELECTRIC MOTOR OPERATION

A. HOIST-TYPE DOOR OPERATORS

1. Industrial-Duty Operator: LiftMaster Industrial-Duty Hoist Operators, continuous-duty, high-starting torque motor with overload protection and an emergency chain hoist with electric interlock.
    a. 1. Model: LiftMaster BH.
2. Electric Operator: Industrial-duty assembly, cULus listed and cULus labeled, with electric motor and factory-prewired motor controls, manually operated chain hoist, 3-button open/close/stop control station, conduit-encased wiring from control circuit to motor, positive locking mechanical system acting as a holding brake, and accessories required for proper operation; door speed of approximately 8 to 9 inches (228.6 mm) per second.
    a. Drive Reduction: Heavy-duty 5L V-belt primary reduction and chain/sprocket secondary and third stage reduction; all reduction sprockets and pulleys shall be drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch and output and door driven sprockets.
    b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
    c. Limit Switches: Fully adjustable, linear-driven limit mechanism synchronizing operator with door; low-friction nylon limit nuts fitted on threaded steel shaft that rotates on oil-tight self- lubricating bronze bushings; motor shall be removable without affecting limit switch settings.
    d. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices. For 3-phase applications, incoming voltage field-selectable between 208V, 230V and 460, 60 Hz by properly positioning connector.
        1) Motor Specification:
            (a) 208/230/460V 60 Hz, 3-phase, 1/2 HP
    e. Motor Control and Enclosure: LiftMaster Logic 5.0 motor control shall be UL-approved microprocessor solid-state type and shall include the capability to select one of 7 wiring types; additional features shall include a maintenance alert diagnostic system, programmable Timer-to-Close with timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS 6.
        1) Radio Receiver: LiftMaster Logic 5.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ 2.0 Rolling Code Technology remote controls and trinary DIP switch remote controls. Tri-band frequency (310/315/390 MHz) sends multiple radio signals to bypass radio interference.
        2) Internet Connectivity: MyQ Technology.
            (a) LiftMaster 828LM Internet Gateway enables monitoring and control of door operators and lighting controls via smartphone, tablet or computer.
            (b) Provides two-way communication between commercial door operator and MyQ Accessories to enable remote open, close and monitoring of commercial door.
    f. 3-Button Control Station: 3-button station providing open/close/stop functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
    g. Door Drive: Full #50 roller chain; operator shall be equipped with an electrically interlocked, floor level disconnect and chain hoist for manual operation.
3. Primary Entrapment Protection Devices:
    a. NEMA 4 Monitored Photo Sensors: LiftMaster Monitored Photo Eyes, non-contact photo beam reversing photo sensor system.
        1) (2) Sets of photo eyes
            (a) First set to be installed with the top of the eye lens no higher than 6 inches (152.4 mm) above the floor in compliance with UL 325.

(b) Second set of eyes to be installed at vehicle bumper height or a height as determined by owner and architect.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine wall and overhead areas, including opening framing and blocking, with installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work in this Section.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 083600 083600

SECTION 084313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Infill panels of glass.

C. Aluminum doors and frames.

D. Weatherstripping.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.

C. Section 087100 - Door Hardware: Hardware items other than specified in this section.

D. Section 088000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2025.

B. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems; 2024.

C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2025.

D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

E. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

F. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2026.

G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

J. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

K. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

L. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

M. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).

N. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015 (Reapproved 2023).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
   1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.

D. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

E. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

F. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

H. Designer's qualification statement.

I. Manufacturer's qualification statement.

J. Installer's qualification statement.

K. Specimen warranty.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
   1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
      a. Insulating Glass Certification Council (IGCC).

C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
   1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
      a. North American Contractor Certification (NACC) for glazing contractors.

1.07 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. See Section 014000 - Quality Requirements for additional requirements.

C. Construct exterior wall assebly mock-up, as indicated on drawings, indicating storefront framing and glazing..

D. Locate where directed.

E. Mock-up may not remain as part of work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum-Framed Storefronts:
1. Arcadia, Inc: www.arcadiainc.com/#sle.
2. Boyd Aluminum: www.boydaluminum.com/#sle.
3. Coral Architectural Products, a division of Coral Industries, Inc: www.coralap.com/#sle.
4. Kawneer North America: www.kawneer.com/#sle.
5. Manko Window Systems, Inc: www.mankowindows.com/#sle.
6. Oldcastle BuildingEnvelope: www.oldcastlebe.com/#sle.
7. Pittco Architectural Metals Inc: www.pittcometals.com/#sle.
8. Reynaers Aluminum: www.reynaers.com/#sle.
9. Tubelite, Inc: www.tubeliteinc.com/#sle.
10. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com/#sle.
11. **YKK AP America, Inc: www.ykkap.com/commercial/#sle. (Basis of Design)**
12. Substitutions: See Section 016000 - Product Requirements.

B. Entrance Doors:
1. Kawneer North America: www.kawneer.com/#sle.
2. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com/#sle.
3. YKK AP America, Inc: www.ykkap.com/commercial/#sle.
4. Substitutions: See Section 016000 - Product Requirements.

2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Thermally-Broken:
1. Basis of Design: YKK AP; 45 XT: www.ykkap.com/ .
2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (51 mm wide by 114 mm deep).

B. Substitutions: See Section 016000 - Product Requirements.
1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.03 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Insulating Glazing, Thermally-Broken:
1. Basis of Design: YKK AP; 50T, www.ykkap.com/.
2. Thickness: 1-3/4 inches (43 mm).

B. Substitutions: See Section 016000 - Product Requirements.
1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.04 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Rabbet: For 1 inch (25 mm) insulating glazing.
   2. Glazing Position: Centered (front to back).
   3. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (50 mm wide by 114 mm deep).
   4. Finish: Superior performing organic coatings.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
   5. Finish Color: Black.
   6. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   7. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   8. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   9. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   10. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   11. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements
   1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
      a. Design Wind Loads: Comply with requirements of ASCE 7.
      b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
   2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf (390 Pa).
   3. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf (75 Pa) pressure difference.
   4. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
   5. Overall U-value Including Glazing: 0.32 Btu/(hr sq ft deg F) (0.06 W/(sq m K)), maximum.

2.05 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Glazing Stops: Flush.
   2. Cross-Section: 2 by 4 1/2 inch (50.8 by 114.3 mm) nominal dimension.
      a. Exterior: 2 by 4 1/2 inch (50.8 by 114.3 mm) nominal dimension.

B. Glazing: See Section 088000.

C. Swing Doors: Glazed aluminum.
   1. Thickness: 2 inches (50 mm).

2. Top Rail: 5 inches (127 mm) wide.
3. Vertical Stiles: 5 inches (127 mm) wide.
4. Bottom Rail: 10 inches (254 mm) wide.
5. Glazing Stops: Square.
6. Finish: Same as storefront.
7. Products:
    a. YKK AP; 50T: www.ykkap.com/..
    b. Substitutions: See Section 016000 - Product Requirements.

2.06 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Fasteners: Stainless steel.

C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

D. Glazing Accessories: See Section 088000.

2.07 FINISHES

A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).

B. Color: Black.

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.08 HARDWARE

A. For each door, include weatherstripping, sill sweep strip, and threshold.

B. Other Door Hardware: See Section 087100.

C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

E. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of sealant and secure.

J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet (1.5 mm per m) non-cumulative or 0.06 inch per 10 feet (1.5 mm per 3 m), whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

3.04 FIELD QUALITY CONTROL

A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.

B. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
   1. Perform a minimum of two tests in each designated area as indicated on drawings.
   2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.

C. Provide field testing of installed storefront system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
   1. Perform a minimum of two tests in each designated area as indicated on drawings.
   2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
   3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 4.18 psf (200 Pa).
      a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce (14 gram) that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
   4. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf (75 Pa).
      a. Maximum allowable rate of air leakage is 0.09 cfm/sq ft (0.5 L/s sq m).

D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 084313

SECTION 087100
DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.

A. Related Sections:

1. Division 01 Section "General Conditions”.
2. Division 06 Section “Rough Carpentry”.
3. Division 08 Section “Operations and Maintenance”.
4. Division 08 Section “Door Schedule”.
5. Division 08 Section “Door Hardware Schedule”.
6. Division 08 Section “Hollow Metal Doors and Frames”.
7. Division 08 Section “Flush Wood Doors”.
8. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
9. Division 26 Section "Electrical”

C. Codes and References: Comply with the version adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 105 - Installation of Smoke Door Assemblies.
6. State Building Codes, Local Amendments.

D. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. UL 305 - Panic Hardware.

1.03 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.04 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.05 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors.

Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.06 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.07 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.08 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

    a. Two Hinges: For doors with heights up to 60 inches.
    b. Three Hinges: For doors with heights 61 to 90 inches.
    c. Four Hinges: For doors with heights 91 to 120 inches.
    d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

    a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
    b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

    a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
    b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

    a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.

5. Manufacturers:

    a. Hager Companies (HA) - BB Series, 5-knuckle.
    b. Ives (IV) - 5BB Series, 5-knuckle.
    c. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.02 CONTINUOUS HINGES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:.

    a. Hager Companies (HA).
    b. Ives (IV).
    c. Pemko (PE).

2.03 POWER TRANSFER DEVICES

A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    a. Securitron (SU) - EL-CEPT Series.

B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

    a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
    b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

    a. McKinney (MK) - QC-C Series.

2.04 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.

3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:

    a. Rockwood (RO).

B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

    a. Rockwood (RO).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
3. Pulls shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
5. Manufacturers:

    a. Rockwood (RO).

2.05 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

1. Manufacturers:

    a. Sargent Manufacturing (SA).
    b. Match Existing, Field Verify.
    c. No Substitution.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Standard.

C. Large Format Interchangeable Cores: Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents.

1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
2. Manufacturers:

    a. Sargent (SA) - Degree DG1.

E. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Three (3).
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

G. Construction Keying: Provide temporary keyed construction cores.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

1.2 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

    a. Lund Equipment (LU).
    b. MMF Industries (MM).
    c. Telkee (TK).

2.06 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - ML2000 Series.
    b. Sargent Manufacturing (SA) - 8200 Series.
    c. Schlage (SC) - L9000 Series.

2.07 INTEGRATED WIRED OUTPUT LOCKING DEVICES - MULTI-CLASS READER

A. Integrated Wired Output Multi-Class Mortise Locks: Wiegand or Open Supervised Device Protocol (OSDP) output ANSI A156.13, Grade 1, mortise lockset with integrated card reader with or without keypad option, request-to-exit signaling, door position status switch, and latchbolt monitoring in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle trim, 3/4" deadlocking anti-friction latch, and 1" case-hardened steel deadbolt. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand or OSDP compatible access control systems. Latchbolt monitoring and door position switch act in conjunction to report door-in-frame (DPS) and door latched (door closed and latched) conditions.
2. Integrated reader supports the following credentials:

    a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
    b. 13.56 MHz proximity credentials: HID Secure Identity Object™ (SIO) on iCLASS Seos, HID iCLASS, HID iCLASS SE/SR, MIFARE Classic, DESFire EV1 and EV2.
    c. 2.4 GHz credentials: Secure Identity Object™ (SIO) on Mobile IDs (Bluetooth Smart)
    d. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant
    e. NFC-enabled mobile phones
    f. PIN code only or PIN + credential with keypad option.

3. 12VDC external power supply required for reader and lock, with optional 24VDC lock solenoid. Fail safe or fail secure options.
4. Energy Efficient Design: Provide lock bodies which have a holding current draw of 500mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
5. Support end-of-line resistors contained within the lock case.
6. Installation requires only one cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
7. Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
8. Manufacturers:

    a. Sargent Manufacturing (SA) - SN200/SN210 8200 Series.
    b. No Substitution.

2.08 DEADLOCKS AND LATCHES

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - DL4000 Series.
    b. Sargent Manufacturing (SA) - 4870 Series.

2.09 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

6. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

8. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Electromechanical exit devices shall have the following functions and features:

    a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
    b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
    c. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
    d. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.
    e. Five-year limited warranty for electromechanical features.

2. Manufacturers:

    a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
    b. Sargent Manufacturing (SA) - 80 Series.
    c. Von Duprin (VD) - 35A/98 XP Series.

2.11 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use.

Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard..

1. Manufacturers:

    a. LCN Closers (LC) - 4040 Series.
    b. Norton Rixson (NO) - 7500 Series.
    c. Sargent Manufacturing (SA) - 351 Series.

2.12 DOOR STOPS AND HOLDERS

A. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood (RO).
    c. Trimco (TC).

B. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

    a. Norton Rixson (NO).
    b. Rockwood (RO).
    c. Sargent Manufacturing (SA).

2.13 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. National Guard Products (NG).
2. Pemko (PE).
3. Zero (ZE).

2.14 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.02 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.03 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.04 FIELD QUALITY CONTROL

3.05 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.06 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.07 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

END OF SECTION 087100

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SECTION 088000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glass coatings.

D. Glazing compounds.

1.02 RELATED REQUIREMENTS

A. Section 014339 - Mockup Requirements.

B. Section 079200 - Joint Sealants: Sealants for other than glazing purposes.

C. Section 081113 - Hollow Metal Doors and Frames: Glazed lites in doors.

D. Section 081416 - Flush Wood Doors: Glazed lites in doors.

E. Section 084313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.

F. Section 088300 - Mirrors.

G. Section 102800 - Toilet, Bath, and Laundry Accessories: Mirrors.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2026).

C. ASTM C1036 - Standard Specification for Flat Glass; 2025.

D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.

F. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.

G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2024.

H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.

I. BS EN 14179-1 - Glass in Building - Heat Soaked Thermally Toughened Soda Lime Silicate Safety Glass - Part 1: Definition and Description; 2016.

J. GANA (GM) - GANA Glazing Manual; 2022.

K. GANA (SM) - GANA Sealant Manual; 2008.

L. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (Reaffirmed 2016).

M. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.

N. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.

O. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2026.

P. NGA (LGRM) - Laminated Glazing Reference Manual; 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit two samples 12 by 12 inch (304.8 by 304.8 mm) in size of glass units.

E. Samples: Submit 12 inch (304.8 mm) long bead of glazing sealant, color as selected.

F. Certificate: Certify that products of this section meet or exceed specified requirements.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with GANA (GM), GANA (SM), IGMA TM-3000, and NGA (LGRM) for glazing installation methods. Maintain one copy on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
   1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
      a. Insulating Glass Certification Council (IGCC).
      b. Safety Glazing Certification Council (SGCC).

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
   1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
      a. North American Contractor Certification (NACC) for glazing contractors.

D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.07 MOCK-UPS

A. See Section 014339 - Mockup Requirements.

B. See Section 014000 - Quality Requirements for additional requirements.

C. Provide mock-up of storefront assembly including glass and air barrier and vapor retarder seal.

D. Provide on-site glazing mock-up with the specified glazing components.

E. Locate where directed.

F. Mock-ups may not remain as part of the Work.

1.08 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

D. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass Fabricators:
1. Alpen High Performance Products: www.thinkalpen.com/#sle.
2. GGI - General Glass International: www.generalglass.com/#sle.
3. Glasswerks: glasswerks.com/#sle.
4. Standard Bent Glass Corp: www.standardbent.com/#sle.
5. Tecnoglass: www.tecnoglass.com/#sle.
6. Thompson I.G., LLC: www.thompsonig.com/#sle.
7. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com/#sle.
8. Viracon, Inc: www.viracon.com/#sle.
9. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
10. Substitutions: See Section 016000 - Product Requirements.

B. Float Glass Manufacturers:
1. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
2. Guardian Glass, LLC: www.guardianglass.com/#sle.
3. Pilkington North America Inc: www.pilkington.com/na/#sle.
4. Saint Gobain North America: www.saint-gobain.com/#sle.
5. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
6. Substitutions: See Section 016000 - Product Requirements.

C. Spandrel Glass Manufacturers:
1. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
2. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com/#sle.
3. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: www.viracon.com/#sle.
4. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
5. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
1. Design Pressure: Calculated in accordance with ASCE 7.
2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7
4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
5. Glass thicknesses listed are minimum.

B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.

1. In conjunction with weather barrier related materials described in other sections, as follows:
2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
3. To maintain a continuous vapor retarder and/or air barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
3. Heat-Soak Testing (HST): Provide HST of fully tempered glass used on canopy, point-supported, spider wall, high-risk, sloping overhead, horizontal overhead, free-standing glass protective barrier, or other demanding applications of project, to reduce risks of spontaneous breakage due to nickel sulfide (NiS) induced fractures in accordance with BS EN 14179-1.
4. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.04 INSULATING GLASS UNITS

A. Manufacturers:
1. Glass: Any of the manufacturers specified for float glass.
2. Alpen High Performance Products: www.thinkalpen.com/#sle.
3. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
4. Glasswerks: glasswerks.com/#sle.
5. Guardian Glass, LLC: www.guardianglass.com/#sle.
6. Pilkington North America Inc: www.pilkington.com/na/#sle.Pilkington North America Inc: www.pilkington.com/na/#sle.
7. Viracon, Apogee Enterprises, Inc: www.viracon.com/#sle.
8. **Vitro Architectural Glass (formerly PPG Glass); Solarban 70: www.vitroglazings.com/#sle. (Basis of Design)**
9. Substitutions: See Section 016000 - Product Requirements.

B. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.

C. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Metal-Edge Spacers: Aluminum, bent and soldered corners.
4. Spacer Color: Black.
5. Edge Seal:

a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
b. Color: Black.

6. Purge interpane space with dry air, hermetically sealed.
7. Pre-Equalized Insulated Glazing Units: Provide glazing units sealed at manufacturing plant with internal pressure matching pressure of the installation location.

D. Type IG-1 - Insulating Glass Units: Vision glass, double glazed; vacuum seal.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with argon.
3. Vacuum seal space between lites.
4. Outboard Lite: Fully tempered float glass, 1/4 inch (6.4 mm) thick, minimum.
a. Tint: Light gray.
b. Coating: Low-E (passive type), on #2 surface.
5. Metal edge spacer.
6. Inboard Lite: Fully tempered float glass, 1/4 inch (6.4 mm) thick, minimum.
a. Tint: Clear.
7. Total Thickness: 1 inch (25.4 mm).
8. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.28, nominal.
9. Visible Light Transmittance (VLT): 64 percent, nominal.
10. Solar Heat Gain Coefficient (SHGC): 0.27, nominal.
11. Visible Light Reflectance, Outside: 13 percent, nominal.
12. Glazing Method: Dry glazing method, gasket glazing.
13. Basis of Design: Vitro Architectural Glass (formerly PPG Glass); Solarban 70: www.vitroglazings.com/#sle. (Basis of Design)

E. Type IG-2 - Insulating Glass Units: Spandrel glazing.
1. Applications: Exterior spandrel glazing unless otherwise indicated.
2. Space between lites filled with argon.
3. Vacuum seal space between lites.
4. Outboard Lite: Fully tempered float glass, 1/4 inch (6.4 mm) thick, minimum.
a. Tint: Clear.
b. Coating: Same as on vision units, on #2 surface.
5. Metal edge spacer.
6. Inboard Lite: Fully tempered float glass, 1/4 inch (6.4 mm) thick.
a. Tint: Clear.
b. Opacifier: Ceramic frit, on #4 surface.
c. Opacifier Color: Gray.
7. Total Thickness: 1 inch (25.4 mm).
8. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.28, nominal.
9. Visible Light Reflectance, Outside: 20 percent, nominal.
10. Glazing Method: Dry glazing method, gasket glazing.
11. Basis of Design: Vitro Architectural Glass (formerly PPG Glass); Solarban 70: www.vitroglazings.com/#sle. (Basis of Design)

F. Type IG-3 - Insulating Glass Units: Vision glass, double glazed; vacuum seal.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with argon.
3. Vacuum seal space between lites.
4. Outboard Lite: Fully tempered float glass, 1/4 inch (6.4 mm) thick, minimum.
a. Tint: Clear.
b. Coating: Low-E (passive type), on #2 surface.
5. Metal edge spacer.
6. Inboard Lite: Fully tempered float glass, 1/4 inch (6.4 mm) thick, minimum.

a. Tint: Clear.
7. Total Thickness: 1 inch (25.4 mm).
8. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.28, nominal.
9. Visible Light Transmittance (VLT): 64 percent, nominal.
10. Solar Heat Gain Coefficient (SHGC): 0.27, nominal.
11. Visible Light Reflectance, Outside: 13 percent, nominal.
12. Glazing Method: Dry glazing method, gasket glazing.
13. Basis of Design: Vitro Architectural Glass (formerly PPG Glass); Solarban 70: www.vitroglazings.com/#sle. (Basis of Design)

2.05 GLAZING UNITS

A. Type G-1 - Monolithic Exterior Vision Glazing:
1. Applications: As scheduled.
2. Glass Type: Annealed float glass.
3. Tint: Clear.
4. Thickness: 1/4 inch (6.4 mm), nominal.

B. Type G-2 - Monolithic Interior Vision Glazing:
1. Applications: As scheduled.
2. Glass Type: Fully tempered float glass.
3. Tint: Clear.
4. Thickness: 1/4 inch (6.4 mm), nominal.

2.06 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch (75 mm) long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
1. Width: As required for application.
2. Spacer Rod Diameter: As required for application.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

C. Verify that sealing between joints of glass framing members has been completed effectively.

D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.

D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

E. Place glazing tape on free perimeter of glazing in same manner described above.

F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

G. Carefully trim protruding tape with knife.

3.06 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

C. Monitor and report installation procedures and unacceptable conditions.

3.07 CLEANING

A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

C. Remove nonpermanent labels immediately after glazing installation is complete.

D. Clean glass and adjacent surfaces after sealants are fully cured.

E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.08 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION 088000

SECTION 088813
FIRE-RATED GLAZING

PART 2 PRODUCTS

1.01 MANUFACTURERS

A. Fire-Resistance-Rated Glass:
   1. Fabricators:
      a. McGrory Glass, Inc; AGC Pyrobel Series Fire-Resistance-Rated Glazing: www.mcgrory.com/#sle.
      b. Technical Glass Products; Pilkington Pyrostop: www.fireglass.com/#sle.
   2. Manufacturers:
      a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite II-XL: www.safti.com/#sle.
      b. Pilkington North America Inc: www.pilkington.com/#sle.
      c. Substitutions: See Section 016000 - Product Requirements.

1.02 PERFORMANCE REQUIREMENTS

A. Provide type and thickness of fire-rated glazing assemblies to support required fire-resistance rating.
   1. Assembly Fire Rating: 45 minutes.

B. Provide type and thickness of exterior glazing assemblies to support assembly dead loads and withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   2. Provide glass edge support system sufficiently stiff to limit lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   3. Glass thicknesses listed are minimum.

1.03 GLASS MATERIALS

1.04 GLAZING UNITS

A. Type FRG-1 - Fire-Resistance-Rated Glazing: Type, thickness, and configuration of glazing that contains flames, smoke, and blocks radiant heat, as required to achieve indicated fire rating period exceeding 45 minutes.
   1. Applications:
      a. Glazing in sidelites, borrowed lites, and other glazed openings in fire-rated wall assemblies.
   2. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
   3. Safety Glazing Certification: 16 CFR 1201 Category II.
   4. Fire Rating Period: As scheduled.
   5. Markings for Fire-Resistance-Rated Glazing Assemblies: Provide permanent markings on fire-resistance-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction.
      a. "W" - meets wall assembly criteria of ASTM E119 or UL 263 fire test standards.
      b. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
      c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire test standards.
      d. 'T' - meets temperature rise of not more than 450 degrees F (250 degrees C) above ambient at end of 30 minutes fire exposure in accordance with NFPA 252, UL 10B, or UL 10C fire test standards.
      e. "XXX" - placeholder that represents fire rating period, in minutes.
   6. Products:

a. McGrory Glass, Inc; AGC Pyrobel Series Fire-Resistance-Rated Glazing: www.mcgrory.com/#sle.
b. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite II-XL 45: www.safti.com/#sle.
c. Technical Glass Products; Pilkington Pyrostop 60: www.fireglass.com/#sle.
d. Substitutions: See Section 016000 - Product Requirements.

1.05 GLAZING COMPOUNDS

A. Type GC-1 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
   1. Manufacturers:
      a. BASF Corporation: www.basf.com/#sle.
      b. Bostik Inc: www.bostik-us.com/#sle.
      c. Dow Corning Corporation: www.dowcorning.com/construction/#sle.
      d. Momentive Performance Materials, Inc: www.momentive.com/#sle.
      e. Pecora Corporation: www.pecora.com/#sle.
      f. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
      g. Substitutions: See Section 016000 - Product Requirements.

1.06 ACCESSORIES

A. Setting Blocks: Aluminum silicate, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape: Closed-cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to affect air barrier and vapor retarder seal.

D. Glazing Gaskets: Flexible intumescent seals.
   1. Material: Co-extruded intercalated graphite combined with thermoplastic lip.

E. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that minimum required face and edge clearances are provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

2.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

2.03 INSTALLATION - GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers unless more stringent requirements are indicated, including those in referenced glazing standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with contaminating substances that may result from construction operations including, but not limited to weld spatter, fire-safing, plastering, mortar droppings, etc.

2.04 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

A. Application - Interior Glazed: Set glazing infills from interior of building.

B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sightline.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches (152 mm) from corners.

D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

E. Place glazing tape on free perimeter of glazing in same manner described above.

F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

G. Carefully trim protruding tape with knife.

2.05 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

2.06 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove nonpermanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than four days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

2.07 PROTECTION

A. After installation, mark pane with 'X' by using removable plastic tape or paste; do not mark heat-absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION 088813

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SECTION 092116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Metal channel ceiling framing.

D. Acoustic insulation.

E. Gypsum wallboard.

F. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 054000 - Cold-Formed Metal Framing: Structural steel stud framing.

B. Section 061000 - Rough Carpentry: Building framing and sheathing.

C. Section 061219 - Miscellaneous Rough Carpentry: Wood blocking product and execution requirements.

D. Section 079200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.

C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015, with Errata (2020).

D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

F. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2025.

G. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).

H. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2026).

I. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.

J. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.

K. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2025.

L. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.

M. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.

N. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020 (Reapproved 2024).

O. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.

P. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2024.

Q. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2024.

R. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

S. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

T. ASTM E413 - Classification for Rating Sound Insulation; 2022.

U. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

C. Sequencing: Install service utilities in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide data on metal framing, gypsum board, accessories, and joint finishing system.
   2. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

C. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

D. Samples: Submit two samples of predecorated gypsum board, 12 by 12 inches (300 by 300 mm) in size, indicating finish color and texture.

E. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches (300 by 300 mm) in size, indicating finish color and texture.

F. Steel Framing Industry Association (SFIA) Certification:
   1. Submit documentation that metal studs and connectors used on project meet or exceed requirements of International Building Code.
   2. Submit current documentation of contractor and fabricator accreditation. Keep copies of each on-site during and after installation, and present upon request.

G. Test Reports: For stud framing products that do not comply with AISI S220 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

H. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. SFIA Code Compliance Certification Program: www.CFSteel.org/#sle: Use metal studs and connectors certified for compliance with International Building Code.

C. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): www.ssma.com/#sle.

D. Professional Contractor and Truss Fabricator Qualifications: SFIA-accredited contractor and fabricator: www.CFSteel.org/#sle.

E. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

F. Documents at Project Site: Maintain at the project site a copy of manufacturer's instructions, erection drawings, and shop drawings.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

C. Store metal products to prevent corrosion.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

B. Interior Partitions: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions in accordance with ASCE 7 for Seismic Design.

D. Grid Suspension Systems: Provide grid suspension systems in accordance with ASTM C840 and GA-216.

2.02 METAL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.
   1. Structural Grade: As required to meet design criteria.
   2. Corrosion Protection Coating Designation: G40, or equivalent in accordance with AISI S220.

B. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
   1. Studs: C-shaped with knurled or embossed faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C-shaped.
   4. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
   5. Furring Members: U-shaped sections, minimum depth of 3/4 inch (19 mm).
   6. Furring Members: Zee-shaped sections, minimum depth of 1 inch (25 mm).

C. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
   2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
   3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
   4. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-resistance rating of the wall assembly.
   5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet (3660 mm).

D. Non-structural Framing Accessories:
   1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
   2. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.

E. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company: www.americangypsum.com/#sle.
   2. CertainTeed Corporation: www.certainteed.com/#sle.
   3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
   4. Gold Bond Building Products, LLC provided by National Gypsum Company: www.goldbondbuilding.com/#sle.
   5. PABCO Gypsum: www.pabcogypsum.com/#sle.
   6. USG Corporation: www.usg.com/#sle.
   7. Substitutions: See Section 016000 - Product Requirements.

B. Abuse Resistant Wallboard:
   1. Application: High-traffic areas indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
   4. Type: Fire-resistance-rated Type X, UL or WH listed.
   5. Thickness: 5/8 inch (16 mm).
   6. Edges: Tapered.

C. Backing Board For Wet Areas: One of the following products:
   1. Application: Surfaces behind tile in wet areas, including toilet rooms.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
      a. Regular Type: Thickness 1/2 inch (13 mm).

D. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings, unless otherwise indicated.
   2. Thickness: 1/2 inch (13 mm).
   3. Edges: Tapered.

E. Exterior Sheathing Board: See Section 061600.

2.04 GYPSUM BOARD ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed mineral-fiber, friction fit type, unfaced; thickness as indicated on drawings.

B. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
   1. Corner Beads: Low profile, for 90 degree outside corners.
   2. L-Trim with Tear-Away Strip: Sized to fit 1/2-inch (13 mm) thick gypsum wallboard.
   3. Expansion Joints:
      a. Type: V-shaped PVC with tear away fins.

C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Paper Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
   2. Joint Compound: Drying type, vinyl-based, ready-mixed.
   3. Joint Compound: Setting type, field-mixed.

D. Finishing Compound: Surface coat and primer, takes the place of skim coating.

E. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

H. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

I. Adhesive for Attachment to Wood, ASTM C557 and Metal:
   1. Products:
      a. Franklin International, Inc; Titebond Drywall Construction Adhesive: www.titebond.com/#sle.
      b. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C1007AISI S220 and manufacturer's instructions.

B. Nonstructural Steel Framing for Application of Gypsum Board: See Section 092216.

C. Structural Steel Framing for Application of Gypsum Board: See Section 054000.

D. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
   1. Level ceiling system to a tolerance of 1/1200.
   2. Laterally brace entire suspension system.

E. Studs: Space studs at 16 inches on center (at 406 mm on center).
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
   3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

F. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

G. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches (100 mm) from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.
   1. Orientation: Vertical.
   2. Spacing: As indicated.

H. Blocking: Install wood blocking for support of:
   1. Framed openings.
   2. Wall-mounted cabinets.
   3. Plumbing fixtures.
   4. Toilet partitions.
   5. Toilet accessories.
   6. Wall-mounted door hardware.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

3.04 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

D. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.06 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   3. Level 3: Walls to receive textured wall finish.
   4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   5. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
   2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

F. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.07 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

3.08 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

3.09 PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION 092116

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SECTION 093000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for wall applications.

B. Coated glass mat backer board as tile substrate.

1.02 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2024.

B. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2021.

C. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.

D. ANSI A137.3/A108.19/A108.20 - American National Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs (Material and Installation Standards); 2025.

E. ANSI A326.3 - American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials; 2021.

F. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018 (Reapproved 2023).

G. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2024.

H. TCNA (HB-GP) - Handbook for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs Installation; 2025-2026.

I. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2025.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches (457 by 457 mm) in size illustrating pattern, color variations, and grout joint size variations.

E. Certificate: Certify products of this section meet or exceed specified requirements.

F. Master Grade Certificate: Submit for each type of tile, signed by the tile manufacturer and tile installer.

G. Installer's qualification statement.

1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation; www.tile-assn.com/#sle

H. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.
2. Extra Tile: 1 percent of each size, color, and surface finish combination, but not less than 1 case of each type.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

B. Installer Qualifications:
1. Company specializing in performing tile installation, with minimum of five years of documented experience.
a. Accredited Five-Star member of NTCA or Trowel of Excellence member of TCAA.

C. Documents on Site: Maintain one copy of ANSI A108/A118/A136, TCNA (HB), ANSI A137.3/A108.19/A108.20, and TCNA (HB-GP) on site.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Tile:
1. American Olean Corporation: www.americanolean.com/#sle.
2. Architessa: www.architessa.com/#sle.
3. Dal-Tile Corporation: www.daltile.com/#sle.
4. Emser Tile, LLC: www.emser.com/#sle.
5. Florim USA: www.milestonetiles.com/#sle.
6. **TileBar: www.tilebar.com. (Basis of design).**
7. Substitutions: See Section 016000 - Product Requirements.

B. Setting Materials:
1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
2. Bostik Inc: www.bostik.com/#sle.
3. Custom Building Products: www.custombuildingproducts.com/#sle.
4. TEC Specialty Products LLC: www.tecspecialty.com/#sle.
5. LATICRETE International, Inc: www.laticrete.com/#sle.
6. Mapei Corporation: www.mapei.com/#sle.
7. Merkrete, by Parex USA, Inc: www.merkrete.com/#sle.
8. Schluter-Systems: www.schluter.com/#sle.
9. Substitutions: See Section 016000 - Product Requirements.

C. Grout:
1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
2. Bostik Inc: www.bostik.com/#sle.

3. Custom Building Products: www.custombuildingproducts.com/#sle.
4. TEC Specialty Products LLC: www.tecspecialty.com/#sle.
5. LATICRETE International, Inc: www.laticrete.com/#sle.
6. Litokol USA: www.tiledoctor.com/#sle.
7. Mapei Corporation: www.mapei.com/#sle.
8. Merkrete, by Parex USA, Inc: www.merkrete.com/#sle.
9. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Floor Tile: Provide tile for flooring applications with minimum wet Dynamic Coefficient of Friction (DCOF) of 0.42 when tested in accordance with ANSI A326.3.

2.03 TILE

A. Porcelain Tile, Type TL-1: ANSI A137.1 standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Size: As indicated on drawings.
   3. Thickness: 3/8 inch (9.5 mm).
   4. Edges: Square.
   5. Surface Finish: Matte.
   6. Color: As indicated on drawings.
   7. Pattern: As indicated on drawings.
   8. Trim Units: Matching bullnose, cove base, and cove shapes in sizes coordinated with field tile.
   9. Products:
      a. Tilebar; New Rock.
      b. Substitutions: See Section 016000 - Product Requirements.

2.04 TRIM AND ACCESSORIES

2.05 SETTING MATERIALS

A. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.
   1. Products:
      a. Custom Building Products: www.custombuildingproducts.com/#sle.
      b. LATICRETE International, Inc: www.laticrete.com/#sle.
      c. Mapei Corporation: www.mapei.com/#sle.
      d. Sika Corp: www.sika.com/#sle.
      e. Substitutions: See Section 016000 - Product Requirements.

2.06 GROUTS

A. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
   1. Applications: Use where indicated on drawings.
   2. Color: As selected by Architect from manufacturer's full line.
   3. Products:
      a. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
      b. Custom Building Products: www.custombuildingproducts.com/#sle.
      c. TEC Specialty Products LLC: www.tecspecialty.com/#sle.
      d. LATICRETE International, Inc: www.laticrete.com/#sle.
      e. Litokol USA: www.tiledoctor.com/#sle.
      f. Mapei Corporation: www.mapei.com/#sle.
      g. Merkrete, by Parex USA, Inc: www.merkrete.com/#sle.
      h. Sika Corp: www.sika.com/#sle.
      i. Stuart Dean Company, Inc: www.stuartdean.com/#sle.
      j. Substitutions: See Section 016000 - Product Requirements.

2.07 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, modified silane polymer, or urethane sealant; moisture- and mildew-resistant type.
   1. Applications: Between tile and plumbing fixtures.
   2. Color: As selected by Architect from manufacturer's full line.

2.08 ACCESSORY MATERIALS

A. Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
   1. Standard Type: 1/2 inch (12.7 mm) thick.

B. Mesh Tape: 2 inch (50 mm) wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify wall surfaces are smooth and flat within tolerances specified for that type of work, are dust-free, and are ready to receive tile.

B. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Vacuum clean surfaces and damp clean.

B. Seal substrate surface cracks with filler.

C. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile and grout in accordance with applicable requirements of ANSI A108/A118/A136, manufacturer's instructions, and TCNA (HB) or TCNA (HB-GP) recommendations, as applicable.

B. Lay tile to pattern indicated on drawings. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Sound tile after setting. Replace hollow sounding units.

G. Keep control and expansion joints free of mortar, grout, and adhesive.

H. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

I. Grout tile joints unless otherwise indicated on drawings. Use standard grout unless otherwise indicated on drawings.

J. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - WALL TILE

A. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.

B. Over interior concrete and masonry, install in accordance with TCNA (HB) Method W202I, thin-set with dry-set or latex-Portland cement bond coat.

3.05 CLEANING

A. Clean tile and grout surfaces.

3.06 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION 093000

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SECTION 095100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

C. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.

D. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019 (Reapproved 2025).

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

F. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2024a.

G. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples: Submit two samples 6 by 6 inch (152.4 by 152.4 mm) in size illustrating material and finish of acoustical units.

E. Samples: Submit two samples each, 12 inches (304.8 mm) long, of suspension system main runner, cross runner, and perimeter molding.

F. Evaluation Service Reports: Show compliance with specified requirements.

G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

H. Designer's qualification statement.

I. Manufacturer's qualification statement.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.06 QUALITY ASSURANCE

A. Designer Qualifications for Seismic Design: Perform under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.

B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:
1. **Armstrong World Industries, Inc: www.armstrongceilings.com/#sle. Basis of Design)**
2. Acoustic Ceiling Products, Inc: www.acpideas.com/#sle.
3. Acoustics First Corporation: www.acousticsfirst.com/#sle.
4. Ceilings4U: www.ceilings4u.com/#sle.
5. Certainteed Architectural: www.certainteed.com/ceilings-and-walls/#sle.
6. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
7. Rockfon: www.rockfon.com/#sle.
8. TECHLITE: www.techlite.com/#sle.
9. USG Corporation: www.usg.com/#sle.
10. Substitutions: See Section 016000 - Product Requirements.

B. Suspension Systems:
1. Same as for acoustical units.

2.02 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Class A in accordance with ASTM E84.

B. Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions determined according to ASCE 7 for Seismic Design Category D, E, or F and complying with the following:
1. Local authorities having jurisdiction.

2.03 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.
1. VOC Content: As specified in Section 016116.

B. Acoustical Panels, Type ACT-1: Mineral fiber with scrubbable finish, with the following characteristics:
1. Applications: As indicated on drawings.
2. Classification: ASTM E1264 Type A.
   a. Form: A3.2, wet formed.
   b. Pattern: G - smooth.
3. Size: 24 by 24 inches (610 by 610 mm).
4. Thickness: 5/8 inch (16 mm).
5. Light Reflectance: 0.89 percent, in accordance with ASTM E1264.
6. Ceiling Attenuation Class (CAC): 33, in accordance with ASTM E1264.
7. Panel Edge: Square.
8. Color: White.
9. Suspension System, Type ESS-1: Exposed grid.
10. Products:

a. Armstrong World Industries, Inc; Kitchen Zone 673: www.armstrongceilings.com/#sle.

2.04 SUSPENSION SYSTEMS

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold-down clips, stabilizer bars, clips, and splices as required.
   1. Materials:
      a. Aluminum Grid: Aluminum sheet, ASTM B209/B209M.

B. Exposed Suspension System, Type ESS-1: Aluminum with aluminum cap.
   1. Applications: Seismic.
   2. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
   3. Profile: Tee; 15/16 inch (24 mm) face width.
   4. Finish: Baked enamel.
   5. Color: White.
   6. Products:
      a. Armstrong World Industries, Inc; Prelude Plus XL Aluminum: www.armstrongceilings.com/#sle.

2.05 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch (2 mm) galvanized steel wire.

C. Seismic Clips: Manufacturer's standard clips for seismic conditions and to suit application.

D. Perimeter Moldings: Same metal and finish as grid.

E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

A. Install after major above-ceiling work is complete.

B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions, as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.

E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to the perimeter molding on two adjacent walls; on opposite walls, maintain a 3/4 inch (19 mm) clearance between grid ends and wall.

G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

I. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.

J. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

F. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

3.05 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.06 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean surfaces.

C. Replace damaged or abraded components.

END OF SECTION 095100

SECTION 095434
SUSPENDED MODULAR CEILING PANELS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.02 SUMMARY

A. Section Includes:
   1. Suspended Acoustical Modular Ceiling Panels
   2. Cable hangers and fasteners

B. Related Sections:
   1. Division 23 Sections - HVAC
   2. Division 26 Sections - Electrical, for integrated lighting

1.03 REFERENCES

A. Test Methods:
   1. ASTM C423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
   2. ASTM E84/CAN/ULC S102 Standard Test Method for Surface Burning Characteristics of Building Materials.

B. QUALITY ASSURANCE

C. Single-Source Responsibility: Provide panels and method of attachment by a single manufacturer.

D. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store the Acoustical Softgrid® modular ceiling panels in an interior location and keep in cartons prior to installation to avoid damage.

B. Exercise care in moving and opening cartons to prevent damage to the panel face.
   1. Handle panels carefully to avoid damaging units in any way.

1.05 PROJECT CONDITIONS

A. Space Enclosure:
   1. Acoustical Panels: All wet work must be complete and dry prior to installation. Installation shall be carried out where the temperature is between 40 degrees Fahrenheit (4.44 degrees Celsius) and 90 degrees Fahrenheit (32.22 degrees Celsius). These temperature conditions must be maintained throughout the life of the warranty.

1.06 WARRANTY

A. A.Acoustical Ceiling Panels: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:
   1. Panels: Manufacturing defects.
   2. Attachment devices: Rusting and manufacturing defects.

B. Warranty Period:
   1. Panels: One (2) year from date of substantial completion.
   2. Attachment devices: One (1) year from date of substantial completion.

C. Warranty Language:

1. Manufacturer’s products are expressly warranted for a period of one (2) year from purchase to be free from defects in material and workmanship, when installed according to manufacturer’s published installation procedures. During the warranty period manufacturer will repair or at its option replace the products that are proven to be defective. Manufacturer is NOT responsible for any intentional or accidental abuse, misuse, or neglect incurred on the original warranted product, and shall as determined by manufacturer, void the warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. **Arktura, LLC: www.arktura.com (Basis of Design)**

B. Substitutions: See Section 016000 - Product Requirements.

2.02 PANEL UNITS

A. Arktura SoftGrid Switch Module, with three (3) SoftGrid integrated Lighting (ACP-1).

B. Panels:
1. Surface Texture: Smooth texture
2. Composition: 12 mm SoftSound PET plastic (up to 60% recycled) + Metal brackets
3. Color: As indicated on drawings.
4. Panel module size: 7' 6" x 7' 6" x 7 7/8"
5. Panel Size: Varies
6. Openness: 95%
7. Acoustics: NRC (F-110) - 0.55

2.03 ATTACHMENT SYSTEM

A. Installation Hardware:
1. 1/32” stianless braded Wire, staniless connector plates and Griplock tensioning hardware

PART 3 - EXECUTION

3.01 PREPARATION

A. Field verify each wall area and establish layout of panels. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation. Panel substructure shall be level and plumb. Panel substructure shall be structurally sound as determined by that subcontractor’s engineer. Panel substructure shall be free of defects detrimental to work and erected in accordance with established building tolerances.

B. Coordinate panel layout with mechanical, electrical and sprinkler fixtures as required.

C. Coordinate delivery of such items to project site.

3.02 INSTALLATION

A. Install panels in accordance with the manufacturer’s instructions and in compliance with the authorities having jurisdiction.

B. Erect panels level and plumb, in proper alignment in relation to substructure framing and established lines.

C. Panel anchorage shall be structurally sound and per engineering recommendations.

D. Locate and place wall panels’ level, plumb, and at indicated alignment with adjacent work.

E. Do not locate the panels in the direct sunlight or sagging from heat and color fade may occur.

3.03 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Routine maintenance of SoftGrid panels should consist of: Blot excess spills from material quickly. Wipe with a damp cloth. If stain persists, apply small quantities of carpet or upholstery shampoo solution with a damp cloth. Blot well with a clean cloth after each application of the

solution. Warning, avoid excessive amounts of water. Note: Ensure adequate ventilation if the product is likely to be subject to excessive moisture

3.04 WASTE MANAGEMENT

A. Soft Sound® may be disposed of in standard PET recycling stream provided that no disqualifying foreign matter has been affixed, such as adhesives.

B. Waste Management:
   1. Coordinate recycling of waste materials with Section 01 74 19 - Construction Waste Management and Disposal.
   2. Collect recyclable waste and dispose of or recycle field generated construction waste created during demolition, construction or final cleaning.
   3. Remove recycling containers and bins from site.

END OF SECTION 095434

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SECTION 096500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 033000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

1.03 REFERENCE STANDARDS

A. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers; 1998 (Reapproved 2023).

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.

C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.

D. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.

E. ASTM F1700 - Standard Specification for Solid Vinyl Floor in Modular Format such as Tile(s) or Plank(s); 2025.

F. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021 (Reapproved 2025).

G. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

H. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

I. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

J. NSF 332 - Sustainability Assessment for Resilient Floor Coverings; 2022.

K. UL 2824 - GREENGUARD Certification Program Method for Measuring Microbial Resistance from Various Sources Using Static Environmental Chambers; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Shop Drawings: Indicate seaming plans and floor patterns.

D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

E. Verification Samples: Submit two samples, 6 by 6 inch (152.4 by 152.4 mm) in size illustrating color and pattern for each resilient flooring product specified.

F. Sustainable Design Submittal: Submit VOC content documentation for flooring and adhesives.

G. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

H. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.

I. Manufacturer's Qualification Statement.

J. Installer's Qualification Statement.

K. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

L. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Flooring Materials: Quantity equivalent to 5 percent of each type and color, but not less than 1 cartain.
   3. Extra Wall Base Materials: Quantity equivalent to 5 percent of each type and color, but not less than 1 cartain.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

C. Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).

D. Protect roll materials from damage by storing on end.

E. Do not double stack pallets.

1.07 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Vinyl Tile - Type LVT-1: Solid vinyl with color and pattern throughout thickness.
   1. Manufacturers:
      a. Armstrong Flooring: www.armstrongflooring.com/#sle.
      b. Flexco Corporation: www.flexcofloors.com/#sle.
      c. HMTX Industries, LLC: www.hmtxcommercial.com/#sle.
      d. LG Hausys America, Inc; : www.lghausysusa.com/#sle.
      e. Mannington Commercial: www.manningtoncommercial.com#sle.
      f. Metroflor Corporation: www.aspectaflooring.com/#sle.
      g. **Patcraft; Earthen II: www.patcraft/. (Basis of Design)**
      h. Roppe Corporation: www.roppe.com/#sle.
      i. Shannon Specialty Floors, Inc: www.shannonspecialtyfloors.com/#sle.
      j. TAJ Flooring: www.tajflooring.com/#sle.
      k. Substitutions: See Section 016000 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.

3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
4. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329; certified in accordance with UL 2824.
5. VOC Content Limits: As specified in Section 016116.
6. NSF 332 Certification: Platinum level.
7. Tile Size: 12 by 24 inch (304.8 by 609.6 mm).
8. Wear Layer Thickness: 0.020 inch (0.50 mm).
9. Total Thickness: 0.16 inch (4 mm).
10. Pattern: As indicated on drawings.
11. Color: As indicated on drawings.

B. Rubber Tile - Type RT-1, RT-2: Homogeneous, color and pattern throughout thickness.
1. Manufacturers:
   a. Flexco Corporation: www.flexcofloors.com/#sle.
   b. Mannington Commercial: www.manningtoncommercial.com#sle.
   c. Roppe Corporation: www.roppe.com/#sle.
   d. **Tarkett Flooring; Color Splash: www.tarkett.com/#sle. (Basis of Design)**
   e. Substitutions: See Section 016000 - Product Requirements.
2. Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
4. Size: 24 by 24 inch (610 by 610 mm) nominal.
5. Total Thickness: 0.125 inch (3.2 mm).
6. Texture: Smooth.
7. Pattern: As indicated on drawings.
8. Color: As indicated on drawings.

2.02 RESILIENT BASE

A. Resilient Base - Type RB-1: ASTM F1861, Type TP, rubber, thermoplastic; style as scheduled.
1. Manufacturers:
   a. Flexco Corporation: www.flexcofloors.com/#sle.
   b. Mannington Commercial: www.manningtoncommercial.com#sle.
   c. Roppe Corporation: www.roppe.com/#sle.
   d. **Tarkett Flooring; Color Match: www.tarkett.com/#sle. (Basis of Design)**
   e. Substitutions: See Section 016000 - Product Requirements.
2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
3. Height: 4 inches (100 mm).
4. Thickness: 0.125 inch (3.2 mm).
5. Finish: Satin.
6. Length: Roll.
7. Color: As indicated on drawings.
8. Accessories: Premolded external corners and internal corners.

B. Resilient Base - Type RB-2: ASTM F1861, Type TP, rubber, thermoplastic; style as scheduled.
1. Manufacturers:
   a. Flexco Corporation: www.flexcofloors.com/#sle.
   b. Mannington Commercial: www.manningtoncommercial.com#sle.
   c. Roppe Corporation: www.roppe.com/#sle.
   d. **Tarkett Flooring; Dura-Cove: www.tarkett.com/#sle. (Basis of Design)**
   e. Substitutions: See Section 016000 - Product Requirements.
2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.

3. Height: 4 inches (100 mm).
4. Thickness: 0.125 inch (3.2 mm).
5. Finish: Satin.
6. Length: Roll.
7. Color: As indicated on drawings.
8. Accessories: Premolded external corners and internal corners.

2.03 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
   1. VOC Content Limits: As specified in Section 016116.

C. Adhesive for Vinyl and Rubber Flooring:
   1. Manufacturers:
      a. TEC Specialty Products LLC; TEC Flexera 2K PSA Hybrid Adhesive: www.tecspecialty.com/#sle.
      b. Loba-Wakol, LLC; WAKOL MS 552 Resilient and Rubber Flooring Adhesive: www.loba-wakol.com/#sle.
      c. Stauf USA, LLC; D737 High-Tack: www.staufusa.com/#sle.
      d. Substitutions: Section 016000 - Product Requirements.

D. Moldings, Transition and Edge Strips: Same material as flooring.

E. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
   1. Test as Follows:
      a. Alkalinity (pH): ASTM F710.
      b. Internal Relative Humidity: ASTM F2170.
      c. Moisture Vapor Emission: ASTM F1869.
   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

C. Prohibit traffic until filler is fully cured.

D. Clean substrate.

E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:
   1. Spread only enough adhesive to permit installation of materials before initial set.
   2. Fit joints and butt seams tightly.
   3. Set flooring in place, press with heavy roller to attain full adhesion.

D. Loose-Laid Installation: Set flooring in place in accordance with manufacturer's instructions.

E. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

F. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Resilient Strips: Attach to substrate using adhesive.

G. Install flooring in recessed floor access covers, maintaining floor pattern.

3.04 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. Install square tile to ashlar pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

3.05 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.07 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 096500

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SECTION 096566
RESILIENT ATHLETIC FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Rubber tile, adhesively installed.

B. Interlocking, loose-laid rubber tile.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 033000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.

C. Section 096500 - Resilient Flooring.

1.03 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

D. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

E. ASTM F2772 - Standard Specification for Athletic Performance Properties of Indoor Sports Floor Systems; 2024.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed data sheets for products specified.

C. Shop Drawings: Fabrication and installation details, and layout, colors, and widths of game lines and equipment locations.

D. Selection Samples: Manufacturer's color charts for flooring materials specified and game line paints, indicating full range of colors and textures available.

E. Verification Samples: Actual flooring material specified, not less than 12 inch (305 mm) square, mounted on solid backing.

F. Test Reports: Submit test reports showing compliance with ASTM F2772.

G. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

H. Sustainable Design Submittal: Submit VOC content documentation for flooring and adhesives.

I. Manufacturer's Instructions: Indicate standard and special installation procedures.

J. Manufacturer's qualification statement.

K. Installer's qualification statement.

L. Testing agency's qualification statement.

M. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.

2. Extra Flooring Material: 10 square yards (9 sq m) matching installed flooring.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.

C. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

1.08 FIELD CONDITIONS

A. Maintain temperature in spaces to receive adhesively installed resilient flooring within range of 70 to 95 degrees F (21 to 35 degrees C) for not less than 48 hours before the beginning of installation and for not less than 48 hours after installation has been completed. Subsequently, do not allow temperature in installed spaces to drop below 50 degrees F (10 degrees C) or to go above 100 degrees F (38 degrees C).

PART 2 PRODUCTS

2.01 PREFORMED ATHLETIC FLOORING

A. Manufacturers: All products by the same manufacturer.
1. Aacer Sports Flooring: www.aacerflooring.com/#sle.
2. Burke Flooring: www.burkeflooring.com/#sle.
3. Dinoflex Group: www.dinoflex.com/#sle.
4. Grid: www.builtbygrid.com/#sle.
5. LG Hausys America, Inc; : www.lghausysusa.com/#sle.
6. Mondo America, Inc: www.mondoworldwide.com/#sle.
7. No Fault Sport Group: www.nofault.com/#sle.
8. Pawling Corporation: www.pawling.com/#sle.
9. Robbins Sports Surfaces: www.robbinsfloor.com/#sle.
10. **Tarkett Sports; Replay Multi-Function: www/tarkettsportsindoor.com/. (Basis of Design)**
11. U.S. Rubber Recycling, Inc: www.usrubber.com/#sle.
12. Substitutions: See Section 016000 - Product Requirements.

B. Rubber Tile Flooring (RAF-1): Recycled SBR (styrene butadiene rubber) and colored EPDM granules with urethane binder.
1. Backing: Recycled black rubber, laminated to colored top layer.
2. VOC Content: As specified in Section 016116.
3. Thickness: Minimum 3/8 inch (9.5 mm).
4. Size: Nominal 24 inch (600 mm) square.
5. Tensile Strength: Minimum 150 psi (1.0 MPa), per ASTM D412.
6. Durometer Hardness, Type A: Minimum of 55, when tested in accordance with ASTM D2240.
7. Tile Edge/Installation: Interlocking shape, loose-laid installation.
8. Interlocking Pins: Manufacturer's standard type.
9. Surface Texture: Hammered.

10. Color: As indicated on drawings.
11. Products:
    a. Tarkett Sports; Replay Multi-Function: www/tarkettsportsindoor.com/.
    b. Substitutions: See Section 016000 - Product Requirements.

2.02 ACCESSORIES

A. Leveling Compound: Latex-modified cement formulation as recommended by flooring manufacturer for substrate conditions.

B. Flooring Adhesive: Waterproof; types recommended by flooring manufacturer.

C. Wall base.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates for conditions detrimental to installation of athletic flooring. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of athletic flooring to substrate.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
1. Test as Follows:
    a. Alkalinity (pH): ASTM F710.
    b. Internal Relative Humidity: ASTM F2170.
    c. Moisture Vapor Emission: ASTM F1869.
2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

B. Concrete: Use leveling compound as necessary to achieve substrate flatness of plus or minus 1/8 inch within 10 ft radius (1/1000).

C. Remove coatings that are incompatible with flooring adhesives, using methods recommended by flooring manufacturer.

D. Broom clean areas to receive athletic flooring immediately before beginning installation.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Rubber Tile Flooring:
1. Lay out center lines in spaces to receive tile flooring, based on location of principal walls. Start tile installation from center, and adjust as necessary to avoid tiles less than one-half width at perimeter.
2. Lay tiles square with room axis, matching for color and pattern by selecting from cartons and mixing as recommended by manufacturer.
3. Spread only enough adhesive to permit installation of materials before initial set.
4. Fit joints and butt seams tightly; press with heavy roller to attain full adhesion.
5. Install loose-laid tile in a staggered pattern; fit interlocking edges tightly.

3.04 CLEANING

A. Clean flooring using methods recommended by manufacturer.

3.05 PROTECTION

A. Protect finished athletic flooring from construction traffic to ensure that it is without damage upon Date of Substantial Completion.

END OF SECTION 096566

SECTION 096700
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied flooring and base.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 079200 - Joint Sealants: Sealing joints between fluid-applied flooring and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

A. ANSI/ESD STM7.1 - The Protection of Electrostatic Discharge Susceptible Items Flooring Systems Resistive Characterization; 2021.

B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.

C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

D. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.

C. Samples: Submit two samples, 12 by 12 inch (304.8 by 304.8 mm) in size illustrating color and pattern for each floor material for each color specified.

D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.

F. Manufacturer's Qualification Statement.

G. Applicator's Qualification Statement.

H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Top Coat Materials: 2 gallons (8 liters).

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section.
   1. Minimum 5 years of documented experience.
   2. Approved by manufacturer.

C. Supervisor Qualifications: Trained by product manufacturer , under direct full time supervision of manufacturer's own foreman.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store resin materials in a dry, secure area.

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.07 FIELD CONDITIONS

A. Maintain minimum temperature in storage area of 55 degrees F (13 degrees C).

B. Store materials in area of installation for minimum period of 24 hours prior to installation.

C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fluid-Applied Flooring:
1. Crossfield Products Corp: www.crossfieldproducts.com/#sle.
2. Duraamen Engineered Products: www.duraamen.com/#sle.
3. Elite Crete Systems: www.elitecrete.com/#sle.
4. Flowcrete Americas: www.flowcreteamericas.com/#sle.
5. Key Resin Company: www.keyresin.com/#sle.
6. LATICRETE International, Inc: www.laticrete.com/#sle.
7. Life Specialty Coatings: www.lifespecialtycoatings.com/#sle.
8. PPG Flooring: www.pittsburghpaintsco.com/#sle and www.ppgpmc.com/home.aspx/#sle.
9. Sherwin-Williams High-Performance Flooring: www.sherwin-williams.com/resin-flooring/#sle.
10. **Stonhard: www.stonhard.com/#sle. (Basis of Design)**
11. Terrazzo & Marble Supply Companies: www.tmsupply.com/#sle.
12. Tnemec Company, Inc: www.tnemec.com/#sle.
13. Substitutions: See Section 016000 - Product Requirements.

2.02 FLUID-APPLIED FLOORING SYSTEMS

A. Fluid-Applied Flooring Type RES-2: Epoxy, with aggregate with integrated base.
1. Aggregate: Quartz granules .
2. System Thickness: 15 mils (0.38 mm), nominal, dry film thickness (DFT).
3. Color: As indicated on drawings.
4. System Components: Manufacturer's standard components that are compatible with each other and as follows:
   a. Primer:
      1) Material Basis: Stonhard Standard Primer
      2) Resin: Epoxy
      3) Formulation Description: (2) two component 100 percent solids.
      4) Application Method: Squeegee and roller.
      5) Number of Coats: (1) one.
      6) Aggregates: Broadcast quartz into wet primer coat.
   b. Body Coat(s):
      1) Material Basis: Stonshield Undercoat.
      2) Resin: Epoxy.
      3) Formulation Description: (3) three component solvent free epoxy.
      4) Application Method: Notched squeegee.
         (a) Thickness of Coats: 25-30 mils with standard primer coat
         (b) Number of Coats: (1) One.
   c. Broadcast:
      1) Material Basis: Stontec Flakes
      2) Formulation Description: Decorative flake, as selected by Architect.
      3) Type: Tweed, chips to be mixed in Mfg. facility.
      4) Finish: Broadcast to rejection.

5) Number of Coats: one.

d. Topcoat:
1) Material Basis: Stonkote CE4
2) Resin: Epoxy.
3) Formulation Description: (2) component, UV stable, solvent free epoxy.
4) Type: Clear.
5) Finish: Gloss. As selected by Architect.
6) Number of Coats: Two.

5. Note: Components listed above are the basis of design intent; all bids will be compared to this standard including resin chemistry, color, wearing surface, thickness, and installation procedures, including number of coats. Contractor shall be required to comply with all the requirements of the Specifications and all of the components required by the Specifications, whether or not such products are specifically listed above.
6. System Physical Properties
a. Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
1) Tensile Strength: 5,200 psi per ASTM D-638
2) Flexural Strength: 4,000 psi per ASTM D-790
3) Flexural Modulus of Elasticity: 1.7 x 10^6 psi per ASTM D-790
4) Hardness: .85 to .90 per ASTM D-2240, Shore D
5) Linear Coefficient of Thermal Expansion: 17 x 10^-6 in./in. ℉ per ASTM C-531
6) Impact Resistance: Exceeds 160 in.-lbs. per ASTM D-4060, CS-17
7) Abrasion Resistance: 0.03 gm max. weight loss per ASTM D-4060, CS-17
b. Flammability: Class I per ASTM E-648
7. Products:
a. Stonhard; Stontec ERF: www.stonhard.com/#sle. (Basis of Design)
b. Substitutions: See Section 016000 - Product Requirements.

B. Fluid-Applied Flooring Type RES-1: Epoxy base coats, with troweled aggregate with integral base.
1. Aggregate: Quartz granules.
2. Top Coat: Polyurethane.
3. System Thickness: 0.79 inch (2 mm), nominal, dry film thickness (DFT).
4. Color: As indicated on drawings.
5. System Components: Manufacturer's standard components that are compatible with each other and as follows:
a. Primer:
1) Material Basis: Stonhard Standard Primer
2) Resin: Epoxy
3) Formulation Description: (2) two component, 100 percent solids.
4) Application Method: Squeegee and roller.
5) Number of Coats: (1) one.
b. Broadcast Media:
1) Material Basis: Stonshield quartz aggregate.
2) Type: pigmented.
3) Finish: As selected by Architect.
4) Number of Coats: one.
5) Pattern: Tweed.
c. Undercoat:
1) Material Basis: Stonshield undercoat.
2) b. Resin: Epoxy
3) Formulation Description: (2) two-component, 100% solids, UV Stable.
4) Type: Clear.
5) Finish: As selected by Architect.

6) Number of Coats: one.

d. Broadcast Media:
1) Material Basis: Stonshield quartz aggregate
2) Type: pigmented.
3) Finish: As selected by Architect.
4) Number of Coats: one.
5) Pattern: Tweed.

e. Sealer:
1) Material Basis: Stonkote CE4.
2) Resin: Epoxy
3) Formulation Description: (2) two-component, 100% solids, UV Stable.
4) Type: Clear.
5) Finish: As selected by Architect.
6) Number of Coats: one.
7) Texture level: Standard or medium—reference finish legend

6. Note: Components listed above are the basis of design intent; all bids will be compared to this standard including resin chemistry, color, wearing surface, thickness, and installation procedures, including number of coats. Contractor shall be required to comply with all the requirements of the Specifications and all of the components required by the Specifications, whether or not such products are specifically listed above.
7. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
a. Tensile Strength: 1,600 psi per ASTM C307
b. Flexural Strength: 4,000 psi per ASTM C580
c. Flexural Modulus of Elasticity: 1.0×10^6 psi per ASTM C580
d. Hardness: 85 to 90 per ASTM D2240, Shore D
e. Impact Resistance: > 160 in./lbs. per ASTM D2794
f. Abrasion Resistance: 0.06 gm max. weight loss per ASTM D 4060, CS-17 7.
g. Flammability: Class 1 per ASTM E-648.
h. Thermal Coefficient of Linear Expansion: 1.4×10^{-5} in./in. ^{o}F
i. Water Absorption: 0.1% per ASTM C 413
j. VOC Content per ASTM D2369:
k. Stonshield Undercoat – 34 g/l b. Stonkote CE4 – 34 g/l
l. Cure Rate @ 77°F/25°C: 12 hours foot traffic, 24 hours normal operations
8. Products:
a. Stonhard; Stonshield SLT: www.stonhard.com/#sle.(Basis of Design)
b. Substitutions: See Section 016000 - Product Requirements.

2.03 ACCESSORIES

A. Base Caps: Zinc with projecting base of 1/8 inch (3 mm); color as selected.

B. Cant Strips: Molded of flooring resin material.

C. Primer: Type recommended by fluid-applied flooring manufacturer.

D. Patching, Leveling and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

E. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for Stonflex MP7 joint fill material

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.

D. Verify that wood subfloors have 12 percent maximum moisture content.

E. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
   1. Test as Follows:
      a. Alkalinity (pH): ASTM F710.
      b. Internal Relative Humidity: ASTM F2170.
      c. Moisture Vapor Emission: ASTM F1869.
   2. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.

F. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring or Diamond Grind with a dust free system.
   1. Mechanically prepare substrates as follows:
      a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
   2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
   3. Verify that concrete substrates are dry.
      a. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 80 percent.
      b. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab in 24 hours.
      c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.
   4. Use patching and fill material to fill holes and depressions in substrates according t o manufacturer's written instructions.
   5. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for Stonflex MP7 joint fill material.

3.03 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
   1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
   2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.

3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations
4. Apply joint sealant to comply with manufacturer's written recommendations.

B. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.

C. Integral Cove Base: Stonshield cove mortar, apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, of cove base. Round internal and external corners.
1. Integral Cove Base: 4 inches high, RES--1 & RES-2, respectively.

D. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.

E. Broadcast: Immediately broadcast quartz silica aggregate into the primer using manufacturer's specially designed spray caster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.

F. Undercoat: Remove any surface irregularities by lightly abrading and vacuuming the floor surface. Mix and apply undercoat with strict adherence to manufacturer's installation procedures and coverage rates.

G. Broadcast: Immediately broadcast quartz silica aggregate into the undercoat using manufacturer's specially designed spray caster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.

H. Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.04 TERMINATIONS

A. Chase edges to “lock” the flooring system into the concrete substrate along lines of termination.

B. Penetration Treatment: Lap and seal resinous system onto the perimeter of the penetrating tem by bridging over compatible elastomer at the interface to compensate for possible movement.

C. Trenches: Continue flooring system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.

D. Treat floor drains by chasing the flooring system to lock in place at point of termination.

3.05 JOINTS AND CRACKS

A. Treat control joints to bridge potential cracks and to maintain monolithic protection.

B. Treat cold joints and construction joints cracks and to maintain monolithic protection on orizontal and vertical surfaces as well as horizontal and vertical interfaces.

C. Vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.06 FIELD QUALITY CONTROL

A. Material Sampling: Owner may at any time and any numbers of times during resinous looring application require material samples for testing for compliance with requirements.
1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.

3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.07 CLEANING, PROTECTING, AND CURING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer. General Contractor is responsible for cleaning prior to inspection.

D. See Section 014000 - Quality Requirements, for additional requirements.

E. Test installed floor surface in accordance with ANSI/ESD STM7.1 .

3.08 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. Barricade area to protect flooring until fully cured.

END OF SECTION 096700

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SECTION 099000
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Interior painting and coating systems.

C. Exterior painting and coating systems.

D. Scope:
   1. Finish surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
      a. Exterior:
         1) Concrete: Cementitious siding, Flexboard, Transite, non-roof shingles, common brick, stucco, tilt-up, precast, and poured-in-place cement.
         2) Masonry: Concrete masonry units (CMU), cinder or concrete block.
         3) Metal: Aluminum, galvanized.
         4) Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, ferrous metal.
         5) Architectural PVC, plastic, and fiberglass.
         6) Drywall: Gypsum board and exterior drywall.
      b. Interior:
         1) Masonry CMU: Concrete, split face, scored, smooth, high density, low density, and fluted.
         2) Metal: Aluminum and galvanized.
         3) Metal, Galvanized: Ceilings and ductwork.
         4) Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and ferrous metal.
         5) Wood: Walls, ceilings, doors, and trim.
         6) Drywall: Walls, ceilings, gypsum board, and similar items.
         7) Concrete: Floors, non-vehicular.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 055000 - Metal Fabrications: Shop-primed items.

1.03 REFERENCE STANDARDS

A. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

B. SSPC-SP 2 - Hand Tool Cleaning; 2024.

C. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

D. SSPC-SP 13/NACE No.6 - Surface Preparation of Concrete; 2018.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Product characteristics.
   2. Surface preparation instructions and recommendations.
   3. Primer requirements and finish specification.
   4. Storage and handling requirements and recommendations.
   5. Application methods.
   6. Clean-up information.

C. Samples: Submit four paper draw down samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

E. Applicator's qualification statement.

F. Maintenance Data: Submit coating maintenance manual including finish schedule showing where each product/color/finish was used, product technical data sheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
   3. Label each container with color in addition to manufacturer's label.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.06 MOCK-UPS

A. See Section 014000 - Quality Requirements for general requirements for mock-ups.

B. Provide one accent wall as directed by Architect to demonstrate color and finish.

C. Provide door and frame assembly indicating paint color, texture, and finish.

D. Locate where directed by Architect.

E. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, product name, product code, color designation, VOC content, batch date, environmental handling, surface preparation, application, and use instructions.

C. Paint Materials: Store at a minimum of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

D. Handling: Maintain a clean, dry storage area to prevent contamination or damage to materials.

1.08 FIELD CONDITIONS

A. Do not apply materials when environmental conditions are outside the ranges required by manufacturer.

B. Follow manufacturer's recommended procedures for producing the best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design Products: Subject to compliance with requirements, provide Sherwin-Williams Company (The) products indicated; www.sherwin-williams.com/#sle.

B. Comparable Products: Products of approved manufacturers will be considered in accordance with 016000 - Product Requirements, and the following:
   1. Other Acceptable Manufacturers:
      a. APV Engineered Coatings: www.apvcoatings.com/#sle.
      b. Dow: www.dow.com/#sle.
      c. Pittsburgh Paints: www.pittsburghpaintsco.com/#sle.
      d. Precision Coatings: www.precisioncoatingsinc.com/#sle.

e. Sika Corporation: www.sikafloorusa.com/#sle.
f. Tnemec Company, Inc: www.tnemec.com/#sle.
g. Wolf-Gordon: www.wolfgordon.com/#sle.

2.02 PAINTINGS AND COATINGS

A. General:
1. Provide factory-mixed coatings unless otherwise indicated.
2. Do not reduce, thin, or dilute coatings or add materials to coatings unless specifically indicated in manufacturer's instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 016116.

C. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

2.03 PAINT SYSTEMS - EXTERIOR

A. Concrete: Cementitious siding, Flexboard, Transite, non-roof shingles, common brick, stucco, tilt-up, precast, and poured-in-place cement.
1. Epoxy Systems, Water Based:
a. Semi-Gloss Finish:
1) 1st Coat: Sherwin-Williams Loxon Block Surfacer, LX01W200: www.sherwin-williams.com/#sle.
(a) 50 to 100 sq ft/gal (1.2 to 2.5 sq m/L).
2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46 Series: www.sherwin-williams.com/#sle.
(a) 4 mils wet, 1.5 mils dry per coat.

B. Masonry: Concrete masonry units (CMU), cinder or concrete block.
1. Epoxy Systems, Water Based:
a. Semi-Gloss Finish:
1) 1st Coat: Sherwin-Williams Loxon Block Surfacer, LX01W200: www.sherwin-williams.com/#sle.
(a) 50 to 100 sq ft/gal (1.2 to 2.5 sq m/L).
2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46 Series: www.sherwin-williams.com/#sle.
(a) 4 mils wet, 1.5 mils dry per coat.

C. Metal: Aluminum, galvanized.
1. Alkyd Systems, Water Based:
a. Semi-Gloss Finish:
1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
(a) 5 mils wet, 2 mils dry per coat.
2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series: www.sherwin-williams.com/#sle.
(a) 4 to 5 mils wet, 1.4 to 1.7 mils dry per coat.

D. Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, ferrous metal.
1. Alkyd Systems, Water Based:
a. Semi-Gloss Finish:
1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
(a) 5 mils wet, 2 mils dry per coat.
2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss, B53-1150 Series: www.sherwin-williams.com/#sle.
(a) 4 to 5 mils wet, 1.4 to 1.7 mils dry per coat.

E. Architectural PVC, plastic, and fiberglass.

1. Latex Systems:
    a. Semi-Gloss Finish:
        1) 1st Coat: Sherwin-Williams Extreme Bond Bonding Primer, B51W00150: www.sherwin-williams.com/#sle.
            (a) 3.1 mils wet, 0.9 mils dry.
        2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series: www.sherwin-williams.com/#sle.
            (a) 2 to 4 mils dry per coat.

F. Drywall: Gypsum board and exterior drywall.
1. Latex Systems:
    a. Satin Finish:
        1) 1st Coat: Sherwin-Williams Latex Wood Primer, B42W8041: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.4 mils dry per coat.
        2) 2nd and 3rd Coat: Sherwin-Williams A-100 Exterior Latex Satin, A82 Series: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.5 mils dry per coat.

2.04 PAINT SYSTEMS - INTERIOR

A. Masonry CMU: Concrete, split face, scored, smooth, high density, low density, and fluted.
1. Epoxy Systems, Water Based:
    a. Semi-Gloss Finish:
        1) 1st Coat: Sherwin-Williams Loxon Block Surfacer, LX01W200: www.sherwin-williams.com/#sle.
            (a) 50 to 100 sq ft/gal (1.2 to 2.5 sq m/L).
        2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46 Series: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.5 mils dry per coat.

B. Metal: Aluminum and galvanized.
1. Epoxy Systems, Water Based:
    a. Semi-Gloss Finish:
        1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
            (a) 5 mils wet, 2 mils dry per coat.
        2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46 Series: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.5 mils dry per coat.

C. Metal, Galvanized: Ceilings and ductwork.
1. Multi-Surface Acrylic Coating System:
    a. Gloss Finish High Performance:
        1) 1st and 2nd Coat: Sherwin-Williams Pro Industrial Multi-Surface Acrylic, B66-1500 Series: www.sherwin-williams.com/#sle.
            (a) 5 mils wet, 2 mils dry per coat.

D. Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and ferrous metal.
1. Epoxy Systems, Water Based:
    a. Semi-Gloss Finish:
        1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
            (a) 5 mils wet, 2 mils dry per coat.
        2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46 Series: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.5 mils dry per coat.

2. Dryfall Waterborne Topcoat:
    a. Semi-Gloss Finish:
        1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
            (a) 5 mils wet, 2 mils dry per coat.
        2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-83 Series: www.sherwin-williams.com/#sle.
            (a) 5.8 mils wet, 2.3 mils dry per coat.

E. Wood: Walls, ceilings, doors, and trim.
1. Latex Systems:
    a. Semi-Gloss Finish:
        1) 1st Coat: Sherwin-Williams Premium Wall and Wood Primer, B28W8111: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.8 mils dry per coat.
        2) 2nd and 3rd Coat: Sherwin-Williams ProClassic Waterborne Acrylic Semi-Gloss, B31 Series: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.3 mils dry per coat.

F. Drywall: Walls, ceilings, gypsum board, and similar items.
1. Epoxy Systems, Water Based:
    a. Eg-Shel/Low Luster Finish:
        1) 1st Coat: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.5 mils dry per coat.
        2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45 Series: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.5 mils dry per coat.

G. Concrete: Floors, non-vehicular.
1. Latex Systems:
    a. Satin Finish:
        1) 1st and 2nd Coat: Sherwin-Williams Porch and Floor Enamel, A32-200 Series: www.sherwin-williams.com/#sle.
            (a) 4 mils wet, 1.5 mils dry per coat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove mildew from impervious surfaces by scrubbing with solution of water and bleach. Rinse with clean water and allow surface to dry.

D. Concrete:
1. Remove release agents, curing compounds, efflorescence, and chalk.
2. Fill bug holes, air pockets, and other voids with cement patching compound.
3. Prepare concrete in accordance with SSPC-SP 13/NACE No.6.

E. Masonry: Remove efflorescence and chalk.

F. Cementitious Siding: Remove dirt, dust and other foreign matter. Pressure clean, if needed, to remove grease, oil, and loose particles.

G. Gypsum Board: Fill minor defects with filler compound; sand smooth and remove dust prior to painting.

H. Concrete Floors and Traffic Surfaces: Prepare concrete in accordance with SSPC-SP 13/NACE No.6.

I. Aluminum: Remove surface contamination and oil; wash with solvent according to SSPC-SP 1.

J. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

K. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Prime bare steel surfaces.
   3. Remove rust, loose mill scale, and other foreign substances using methods recommended by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.

L. Wood: Remove dust, grit, and foreign matter. Scrape, sand, and spot prime knots and pitch streaks. Fill nail holes and imperfections with wood filler and sand smooth.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions.

C. Apply coatings at spread rate required to achieve manufacturer's recommended dry film thickness.

D. Regardless of number of coats specified, apply additional coats until complete hide is achieved.

3.04 PRIMING

A. Apply primer to all surfaces unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

B. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to top coat manufacturers.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.06 PROTECTION

A. Protect finished coatings from damage until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 099000

SECTION 101200
DISPLAY CASES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured recessed display cases.

B. Fabricated recessed display cases.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Blocking and supports.

B. Section 092216 - Non-Structural Metal Framing: Concealed supports in metal stud walls.

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit complete printed data and installation details indicating products to be provided as specified.
   1. Submit color charts for selection by the Architect.

C. Shop Drawings: Submit complete installation details. Include dimensioned elevations.

D. Samples: Submit samples of material and trim to illustrate finish, color, and texture.

E. Manufacturer's Qualification Statement.

F. Maintenance Data: _____.

G. Specimen Warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver display cases and materials to the Project site with manufacturer’s protective crate covering and do not open until ready for use.

B. Protect display cases before, during, and after installation. In case of damage, immediately provide necessary repairs and replacements.

1.07 FIELD CONDITIONS

A. Field Measurements: Verify field measurements for recessed application for display cases before preparation of shop drawings and before fabrication to ensure proper installation.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against defects and in materials, finish product and workmanship.

PART 2 PRODUCTS

2.01 DISPLAY CASES

A. Manufacturers:
   1. Claridge Products and Equipment, Inc: www.claridgeproducts.com/#sle.
   2. **Ghent; Recessed Series, Style 1400: www.ghent.com/. (Basis of Design)**
   3. MooreCo, Inc: www.moorecoinc.com/#sle.
   4. Nelson Adams NACO: https://nelsonadamsnaco.com/#sle.
   5. Platinum Visual Solutions, SDS Series: www.pvsusa.com/.
   6. Substitutions: See Section 016000 - Product Requirements.

B. Manufactured Recessed Display Case (DC-1): Factory-fabricated wood-framed display case with adjustable glass shelves, finished interior, and aluminum trim on face to cover edge of recessed opening.
   1. Width: 7 feet (2133.6 mm).
   2. Height: 6 feet (1829 mm).
   3. Depth: 18 inches (457 mm).
   4. Components:
      a. Glazed Doors: Sliding.
         1) Number of Doors: Two pair.
      b. Side Panels: Stained veneer plywood.
      c. Back Panel: Tackable Forbo Cork.
      d. Top Panel: Stained veneer plywood.
      e. Bottom Panel: Stained veneer plywood.
      f. Lighting: LED.

C. Fabricated Recessed Display Case (DC-2): Factory-fabricated wood-framed display case with adjustable glass shelves, finished interior.
   1. Width: 18 feet (5486 mm).
   2. Height: 54 inches (1372 m).
   3. Depth: 48 inches (1219 mm).
   4. Components:
      a. Glazed Doors: Fixed insulated storefront, by other subcontractor.
      b. Side Panels: Stained veneer plywood.
      c. Back Panel: Tackable Forbo Cork.
      d. Top Panel: Stained veneer plywood.
      e. Bottom Panel: Stained veneer plywood.
      f. Lighting: By other subcontractor.

2.02 COMPONENTS

A. Wood Case Construction: 3/4 inch (19 mm) 7-ply maple veneer plywood with manufacturer's standard stain.

B. Glazed Sliding Doors:
   1. 1/4 inch (6 mm) clear tempered glass with plastic finger pulls.
   2. Door track: Extruded aluminum glass shoe with bottom rollers and top plastic guide.
   3. Lock: Glass door cylinder lock.

C. Fixed Storefront Front Panel: See Section 084313 - Aluminum-Framed Storefront.

D. Glass Shelves:
   1. 1/4 inch (6 mm) clear tempered glass with flat-polished edges.
   2. Shelf Depth: 6 inches (152 mm).
   3. Shelves per Unit: Two.

E. Shelf Standards and Brackets: Single-slotted channel standards for brackets adjustable in 1 inch (25 mm) increments along entire length of standard, drilled and countersunk for screws.
   1. Standards Mounting: Recess-mounted into back panel.

2. Face Width: 5/8 inch (16 mm).
3. Material: 16 gauge, 0.0598 inch (1.52 mm) sheet steel.
4. Lengths: As indicated on drawings.
5. Finish: Anochrome.
6. Brackets: Boltless with lip front; 16 gauge, 0.0598 inch (1.52 mm) sheet steel, reinforced, locking into slots; size to suit shelves; same finish as standards.

F. Tackable Back Panel: Fine-grained, homogeneous natural cork on hardboard.
1. Cork Thickness: 1/4 inch (6 mm).
2. Fabric: Vinyl fabric; minimum fabric weight: 13 oz/sq yd (440 g/sq m).
3. Backing: Hardboard, 1/4 inch (6 mm) thick, factory laminated to tack surface.
4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.

G. Lighting: Manufacturer's standard LED light fixture housed at top of case with louvered aluminum access door with keyed lock.
1. Surface Mounted: Under cabinet type fixture.
2. Controls: On/Off using dedicated wall switch.

2.03 MATERIALS

A. Aluminum Extrusions for Framing and Trim: Alloy as recommended by manufacturer for construction and specified finish; nominal 1/8 inch (3.2 mm) wall thickness.

B. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper.

C. Plywood: Softwood plywood with veneer core, waterproof glue, 3/4 inch (19 mm) thick.

D. Heat-Strengthened and Fully Tempered Glass: ASTM C1048, Kind FT.

PART 3 EXECUTION

3.01 PREPARATION

A. Rough openings, electrical pre-wiring, and final finishing are by other trades.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide factory trained installers.

C. Locate fastening devices to secure cases securely to back and sides of rough opening.

D. Install recessed display cases plumb and level in wall openings, as indicated on drawings.

E. Refer to drawings for display case mounting heights.

F. Provide vinyl wrapped H-moldings to match vinyl covered boards.

G. Clean case and glass using manufacturers recommended procedures.

H. Provide mitered and wrapped hairline joints for all trims.

3.03 ADJUSTING AND CLEANING

A. Verify that all accessories are installed as detailed for each unit.

B. At completion of work, clean glass surfaces, back panels and trim in accordance with manufacturer’s recommendations leaving units ready for use.

3.04 CLOSEOUT ACTIVITIES

A. See Section 017800 - Closeout Submittals, for closeout submittals.

END OF SECTION 101200

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SECTION 101416
PLAQUES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plaques.

1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of plaque sign, indicating style, font, foreground and background colors, locations, and overall dimensions of each sign.

C. Shop Drawings: Indicate dimensions, locations, elevations, materials, text and graphic layout, and attachment details.

D. Samples: One sample of each type of plaque sign, of size similar to that required for project, indicating style, font, and method of attachment.

E. Selection Samples: Where materials, colors, and finishes are not specified, submit two sets of color selection charts or chips.

F. Manufacturer's qualification statement.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package plaque signs as required to prevent damage before installation.

B. Store under cover and elevated above grade.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Plaques:
   1. A.R.K. Ramos: www.arkramos.com/#sle.
   2. FASTSIGNS International, Inc: www.fastsigns.com/#sle.
   3. Takeform: www.takeform.net/#sle.
   4. Substitutions: See Section 016000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

A. Accessibility Requirements: Comply with ADA Standards, ICC A117.1, the State of Delaware Architectural Accessibility Standards, and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.03 PLAQUES

A. Metal Plaques:
   1. Material: Aluminum casting.
   2. Material Thickness: Manufacturer's standard.
   3. Size: As indicated on drawings.
   4. Text and Typeface:
      a. Character Font: As selected by Architect from manufacturer's full range.
      b. Character Case: As selected by Architect from manufacturer's full range.

c. Character Color: Contrast with background color.
5. Border Style: As selected by Architect from manufacturer's standard borders.
6. Background Texture: Pebble.
7. Surface Finish: As selected by Architect from manufacturer's full range.
8. Painted Background Color: As selected by Architect from manufacturer's standard background colors.
9. Protective Coating: Manufacturer's standard clear coating.
10. Mounting: Rosettes, machine screws, and expansion sleeves.
    a. Rosette Style: As selected by Architect from manufacturer's standard rosettes.
    b. Rosette Diameter: 3/4 inch (19 mm).
11. Content: To be provided by Owner.

2.04 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install with horizontal edges level.

C. Locate plaque signs and mount at heights indicated on drawings and in accordance with ADA Standards, ICC A117.1, and the State of Delaware Architectural Accessibility Standards.

D. Protect from damage until Substantial Completion ; repair or replace damaged items.

END OF SECTION 101416

SECTION 101419
DIMENSIONAL LETTER SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dimensional letter signage.

B. Non-illuminated, fabricated channel dimensional characters.

1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.

C. Shop Drawings:
   1. Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.

D. Samples: Submit one sample of each type of dimensional letter sign of size similar to that required for project, indicating sign style, font, and method of attachment.

E. Selection Samples: Where materials, colors, and finishes are not specified, submit two sets of selection charts or chips.

F. Verification Samples: Submit samples showing colors and finishes specified.

G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

H. Manufacturer's qualification statement.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package dimensional letter signs as required to prevent damage before installation.

B. Store under cover and elevated above grade.

C. Store tape adhesive at a normal room temperature of 68 to 72 degrees F (20 to 22 degrees C).

1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Dimensional Letter Signs:
   1. A.R.K. Ramos: www.arkramos.com/#sle.
   2. CityScapes Inc: www.cityscapesinc.com/#sle.
   3. FASTSIGNS International, Inc: www.fastsigns.com/#sle.
   4. Inpro Corporation: www.inprocorp.com/#sle.
   5. Takeform: www.takeform.net/#sle.
   6. Substitutions: See Section 016000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

A. Accessibility Requirements: Comply with ADA Standards, ICC A117.1, the State of Delaware Architectural Accessibility Standards, and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.03 DIMENSIONAL LETTERS

A. Applications: Building identification.
   1. Use individual plastic letters.
   2. Non-illuminated, metal fabricated channel dimensional characters.
   3. Mounting Location: Exterior as indicated on drawings.

B. Metal Letters DLS-3:
   1. Fabricated Channel Characters: Metal face, back and side returns, formed free from warp and distortion; with uniform faces, sharp corners, and precisely formed lines and profiles; internally braced for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
      a. Non-illuminated fabricated channel dimensional characters with solid face.
      b. Material: Aluminum sheet.
      c. Thickness: Manufacturer's standard for letter size and prevents oil-canning.
      d. Letter Height: As indicated on drawings .
      e. Text and Typeface:
         1) Character Font: Custom, Varsity condensed, connected .
         2) Character Case: Upper case only.
      f. Text:
         1) WILLIAM PENN.
         2) Location: As indicated on drawings.
      g. Finish: As selected by Architect from manufacturer's full range.
      h. Color: As indicated on drawings.
      i. Mounting: Projected mount with collars.

C. Plastic Letters DLS-1:
   1. Material: Injection molded plastic.
   2. Thickness: Manufacturer's standard for letter size.
   3. Letter Height: As indicated on drawings.
   4. Text and Typeface:
      a. Character Font: Varsity.
      b. Character Case: Upper case only.
      c. Text:
         1) HOME
         2) AWAY
         3) Location: As indicated on drawings.
   5. Finish: As selected by Architect from manufacturer's full range.
   6. Color: As selected by Architect from manufacturer's full range.
   7. Mounting: Projected mount with collars.

D. Plastic Letters DLS-2:
   1. Material: Injection molded plastic.
   2. Thickness: Manufacturer's standard for letter size.
   3. Letter Height: As indicated on drawings .
   4. Text and Typeface:
      a. Character Font: As selected by Architect from manufacturer's full range .
      b. Character Case: Upper case only.
   5. Text:
      a. HOME OF THE COLONIALS
      b. Location: As indicated on drawings.

6. Finish: As selected by Architect from manufacturer's full range.
7. Colors:. As selected by Architect from manufacturer's full range
8. Mounting: Projected mount with collars .

2.04 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

B. Tape Adhesive: Double-sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install with horizontal edges level.

C. Locate dimensional letter signs and mount at heights indicated on drawings and in accordance with ADA Standards , ICC A117.1, and the State of Delaware Architectural Accessibility Standards.

D. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION 101419

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SECTION 101423
PANEL SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Panel signage.

1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.

C. Shop Drawings:
   1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
   2. Show locations of electrical service connections.
   3. Include diagrams for power, signal, and control wiring.
   4. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
      a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
      b. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
      c. Submit for approval by Owner through Architect prior to fabrication.

D. Samples: Submit two samples of each type of sign, of size similar to that required for project, indicating sign style, font, and method of attachment.

E. Selection Samples: Where colors, materials, and finishes are not specified, submit two sets of color selection charts or chips.

F. Verification Samples: Submit samples showing colors, materials, and finishes specified.

G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

H. Manufacturer's qualification statement.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store under cover and elevated above grade.

D. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Panel Signage:
1. Best Sign Systems, Inc: www.bestsigns.com/#sle.
2. FASTSIGNS International, Inc: www.fastsigns.com/#sle.
3. Inpro Corporation: www.inprocorp.com/#sle.
4. Mohawk Sign Systems, Inc: www.mohawksign.com/#sle.
5. Seton Identification Products: www.seton.com/aec/#sle.
6. Takeform: www.takeform.net/#sle.
7. Vista System LLC: www.vistasystem.com/#sle.
8. Substitutions: See Section 016000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

A. Accessibility Requirements: Comply with ADA Standards, ICC A117.1, the State of Delaware Architectural Accessibility Standards, and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.03 PANEL SIGNAGE

A. Panel Signage Type A1 Typical Room Sign:
1. Application: Room and door signs.
2. Description: Flat signs with injection molded panel media, tactile characters.
3. Sign Size: 6 inches by 6 inches (152 mm by 152 mm).
4. Total Thickness: 1/8 inch (3 mm).
5. Sign Edges: Squared.
6. Letter Edges: Squared.
7. Corners: Radiused.
8. Color and Font, unless otherwise indicated:
    a. Character Font: Helvetica, Arial, or other sans serif font.
    b. Character Case: Upper case only.
    c. Background Color: As selected by Architect from manyfacturer's full range.
    d. Character Color: As selected by Architect from manyfacturer's full range color.
9. Material: One-piece injection molded acrylic plastic with raised letters and braille.
10. Profile: Flat panel without frame.
11. Tactile Letters: Raised 1/32 inch minimum.
12. Room numbers size: As indicated on drawings.
13. Room name size: As indicated on drawings.
14. Braille: Grade II, ADA-compliant.
15. One-Sided Wall Mounting: Tape adhesive.

B. Panel Signage Type A2 Room Sign:
1. Sign Size: 6 inches by 3 inches (76 mm by 76 mm).
2. Total Thickness: 1/8 inch (3 mm).
3. Sign Edges: Squared.
4. Letter Edges: Squared.
5. Corners: Radiused.
6. Color and Font, unless otherwise indicated:
    a. Character Font: Helvetica, Arial, or other sans serif font.
    b. Character Case: Upper case only.
    c. Background Color: As selected by Architect from manyfacturer's full range.

d. Character Color: As selected by Architect from manyfacturer's full range color.
7. Material: One-piece injection molded acrylic plastic with raised letters and braille.
8. Profile: Flat panel without frame.
9. Tactile Letters: Raised 1/32 inch minimum.
10. Room numbers size: As indicated on drawings.
11. Room name size: As indicated on drawings.
12. Braille: Grade II, ADA-compliant.
13. One-Sided Wall Mounting: Tape adhesive.

C. Panel Signage Type D Room Number Sign:
1. Application: Room and door signs.
2. Description: Flat signs with injection molded panel media, tactile characters.
3. Sign Size: 6 inches by 3 inches (76 mm by 76 mm).
4. Total Thickness: 1/8 inch (3 mm).
5. Sign Edges: Squared.
6. Letter Edges: Squared.
7. Corners: Radiused.
8. Color and Font, unless otherwise indicated:
a. Character Font: Helvetica, Arial, or other sans serif font.
b. Character Case: Upper case only.
c. Background Color: As selected by Architect from manyfacturer's full range.
d. Character Color: As selected by Architect from manyfacturer's full range color.
9. Material: One-piece injection molded acrylic plastic with raised letters and braille.
10. Profile: Flat panel without frame.
11. Tactile Letters: Raised 1/32 inch minimum.
12. Room numbers size: As indicated on drawings.
13. Braille: Grade II, ADA-compliant.
14. One-Sided Wall Mounting: Tape adhesive.

D. Panel Signage Type B1 & B2 Toilet Room Signs:
1. Application: Room and door signs.
2. Description: Flat signs with engraved panel media, tactile characters.
3. Sign Size: 6 inches by 8 inches (152 mm by 203 mm).
4. Total Thickness: 1/8 inch (3 mm).
5. Sign Edges: Squared.
6. Letter Edges: Squared.
7. Corners: Radiused.
8. Color and Font, unless otherwise indicated:
a. Character Font: As selected by Architect from manufacurer's full range .
b. Character Case: Upper case only.
c. Background Color: As selected by Architect from manufacturers full range.
d. Character Color: As selected by Architect from manufacurer's standard range.
e. Pictograms:
1) Type B1: Room number, Male, International Symbol of Accessibility (ISA), MALE, braille.
2) Type B2: Room number, Female, International Symbol of Accessibility (ISA), FEMALE, braille.
f. Pictogram Color: As selected by Architect from manufacurer's standard rangeAs selected by Architect from manufacturers full range color,
9. Material: One-piece injection molded acrylic plastic with raised letters and braille.
10. Tactile Letters: Raised 1/32 inch minimum.
11. Room numbers size: As indicated on drawings.
12. Room name size: As indicated on drawings.
13. Braille: Grade II, ADA-compliant.

14. One-Sided Wall Mounting: Tape adhesive.

E. Panel Signage Type B3 Private Toilet Room Sign:
1. Application: Room and door signs.
2. Description: Flat signs with engraved panel media, tactile characters.
3. Sign Size: 6 inches by 8 inches (152 mm by 203 mm).
4. Total Thickness: 1/8 inch (3 mm).
5. Sign Edges: Squared.
6. Letter Edges: Squared.
7. Corners: Radiused.
8. Color and Font, unless otherwise indicated:
   a. Character Font: As selected by Architect from manufacurer's full range .
   b. Character Case: Upper case only.
   c. Background Color: As selected by Architect from manufacturers full range.
   d. Character Color: As selected by Architect from manufacurer's standard range.
   e. Pictograms: Room Number, Male, Female, International Symbol of Accessibility (ISA), TOILET, braille.
   f. Pictogram Color: As selected by Architect from manufacurer's standard rangeAs selected by Architect from manufacturers full range color,
9. Material: One-piece injection molded acrylic plastic with raised letters and braille.
10. Tactile Letters: Raised 1/32 inch minimum.
11. Room numbers size: As indicated on drawings.
12. Room name size: As indicated on drawings.
13. Braille: Grade II, ADA-compliant.
14. One-Sided Wall Mounting: Tape adhesive.

F. Panel Signage Type C1 Exit Sign:
1. Application: Exterior egress door signs.
2. Description: Flat signs with injection molded panel media, tactile characters.
3. Sign Size: 6 inches by 3 inches (76 mm by 76 mm).
4. Total Thickness: 1/8 inch (3 mm).
5. Sign Edges: Squared.
6. Letter Edges: Squared.
7. Corners: Radiused.
8. Color and Font, unless otherwise indicated:
   a. Character Font: Helvetica, Arial, or other sans serif font.
   b. Character Case: Upper case only.
   c. Background Color: As selected by Architect from manyfacturer's full range.
   d. Character Color: As selected by Architect from manyfacturer's full range color.
9. Material: One-piece injection molded acrylic plastic with raised letters and braille.
10. Profile: Flat panel without frame.
11. Tactile Letters: Raised 1/32 inch minimum.
12. Message informations: EXIT.
13. Message size: As indicated on drawings.
14. Braille: Grade II, ADA-compliant.
15. One-Sided Wall Mounting: Tape adhesive.

G. Panel Signage Type C2 Exit Sign:
1. Application: Exterior egress door signs.
2. Description: Flat signs with injection molded panel media, tactile characters.
3. Sign Size: 2 inches by 8 inches (50.8 mm by 203.2 mm).
4. Total Thickness: 1/8 inch (3 mm).
5. Sign Edges: Squared.
6. Letter Edges: Squared.
7. Corners: Radiused.

8. Color and Font, unless otherwise indicated:
    a. Character Font: Helvetica, Arial, or other sans serif font.
    b. Character Case: Upper case only.
    c. Background Color: As selected by Architect from manyfacturer's full range.
    d. Character Color: As selected by Architect from manyfacturer's full range color.
9. Material: One-piece injection molded acrylic plastic with raised letters and braille.
10. Profile: Flat panel without frame.
11. Tactile Letters: Raised 1/32 inch minimum.
12. Message informations: EXIT.
    a. Verical staked charaters for mounting on storefront vertical member.
13. Message size: As indicated on drawings.
14. Braille: Grade II, ADA-compliant.
15. One-Sided Wall Mounting: Tape adhesive.

H. Panel Signage Type E1 & E2 Directional Toilet Room Signs:
1. Application: Interior directional and information signs.
2. Description: Flat signs with engraved panel media, nontactile characters.
3. Sign Size: 12 inches by 6 inches (304 mm by 152 mm).
4. Total Thickness: 1/8 inch (3 mm).
5. Sign Edges: Squared.
6. Letter Edges: Squared.
7. Corners: Squared.
8. Color and Font, unless otherwise indicated:
    a. Character Font: As selected by Architect from manufacurer's full range .
    b. Character Case: Upper case only.
    c. Background Color: As selected by Architect from manufacturers full range.
    d. Character Color: As selected by Architect from manufacurer's standard range.
    e. Pictograms:
        1) Type E1: Room number, Male, International Symbol of Accessibility (ISA), MALE, braille.
        2) Type E2: Room number, Female, International Symbol of Accessibility (ISA), FEMALE, braille.
    f. Pictogram Color: As selected by Architect from manufacturers full range color,
9. Material: One-piece injection molded acrylic plastic.
10. Profile: Flat panel without frame.
11. Room name size: As indicated on drawings.
12. Two-Sided Wall Mounting: Wall bracket, exposed fasteners.

2.04 SIGNAGE APPLICATIONS

A. Room and Door Signs:
1. Office Doors: Identify with room names and numbers to be determined later, not those indicated on drawings.
2. Conference and Meeting Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
3. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
4. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille.

B. Interior Directional and Informational Panel Signs:
1. Where suspended, ceiling mounted, or projecting from wall signs are indicated, provide two-sided signs with same information on both sides.

2.05 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

B. Exposed Screws: Chrome plated.

C. Tape Adhesive: Double-sided tape, permanent adhesive.

D. Electrical Components and Devices: Listed and labeled as defined in NFPA 70 by a qualified testing agency.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install with horizontal edges level.

C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards, ICC A117.1, and the State of Delaware Architectural Accessibility Standards.

D. Protect from damage until Substantial Completion ; repair or replace damaged items.

3.03 SIGN SCHEDULE

FIELD HOUSE BUILDING (F)

DOOR #	ROOM #	SIGN TYPE	W	H	TEXT LINE - 1	TEXT LINE 2	TEXT LINE 3	TEXT LINE 4
F100/1	F100	A1	6	6	F100	HALL OF FAME		BRAILLE
F100/1	F100	C2	6	3	EXIT			BRAILLE
F100/2	F100	A1	6	6	F100	HALL OF FAME		BRAILLE
F100/2	F100	C2	6	3	EXIT			BRAILLE
F101/1	F101	A1	6	6	F101	SECURITY		BRAILLE
F102/1	F102	A1	6	6	F102	SECURITY		BRAILLE
F103/1	F103	A1	6	6	F103	MECH ROOM		BRAILLE
F104/1	F104	A1	6	6	F104	CONCESSION		BRAILLE
F104/2	F104	A1	6	6	F104	CONCESSION		BRAILLE
F105/1	F105	A1	6	6	F105	STORAGE		BRAILLE
F106/1	F106	B3	6	8	F106	FEMALE ISA ICON	FEMALE	BRAILLE
CORR	F106	E2	12	6		FEMALE ISA ICON	FEMALE	
F107/1	F107	B2	6	8	F107	MALE ISA ICON	MALE	BRAILLE
CORR	F107	E1	12	6		MALE ISA ICON	MALE	
F108/1	F108	A1	6	6	F108	CUSTODIAL		BRAILLE
F112/1	F112B	A1	6	6	F112B	ELEC ROOM		BRAILLE
F112/2	F112	A1	6	6	F112	ATHLETIC	EQUIPMENT	BRAILLE
F112/3	F112	A1	6	6	F112	ATHLETIC	EQUIPMENT	BRAILLE
F113/1	F113	A1	6	6	F113	AWAY LOCKERS		BRAILLE
F113/1	F113	C1	6	3	EXIT			BRAILLE
F113/2	F113	A1	6	6	F113	AWAY LOCKERS		BRAILLE
F113/2	F113	C1	6	3	EXIT			BRAILLE

F114/1	F114Z	A1	6	6	F114Z	CLASSROOM		BRAILLE
F114/1	F114Z	C1	6	3	EXIT			BRAILLE
F114/2	F114Y	A1	6	6	F114Y	CLASSROOM		BRAILLE
F114/2	F114Y	C1	6	3	EXIT			BRAILLE
F114/3	F114X	A1	6	6	F114X	CLASSROOM		BRAILLE
F114/3	F114X	C1	6	3	EXIT			BRAILLE
F114/4	F114D	B3	6	8	F114D	MALE/FEMALE ISA ICON	TOILET	BRAILLE
F114/5	F114C	A1	6	6	F114C	STORAGE		BRAILLE
F114/6	F114B	A1	6	6	F114B	IDF		BRAILLE
F114/7	F114A	A1	6	6	F114A	STORAGE		BRAILLE
F115/1	F115	A1	6	6	F115	WEIGHT	ROOM	BRAILLE
F115/3	F115C	A1	6	6	F115C	LAUNDRY		BRAILLE
F115/4	F115A	B3	6	8	F115A	MALE/FEMALE ISA ICON	TOILET	BRAILLE
F115/5	F115B	A1	6	6	F115B	CUSTODIAL		BRAILLE
F116/1	F116	A1	6	6	F116	HOME LOCKERS		BRAILLE
F116/1	F116	C1	6	3	EXIT			BRAILLE
F116/2	F116	A1	6	6	F115	WEIGHT	ROOM	BRAILLE
F116/3	F116	A1	6	6	F116	HOME LOCKERS		BRAILLE
F116/3	F116	C1	6	3	EXIT			BRAILLE
F117/1	F117	A1	6	6	F117	OFFICIAL	OFFICE	BRAILLE
F117/2	F117A	B3	6	8	F117A	MALE/FEMALE ISA ICON	TOILET	BRAILLE
F118/1	F118	A1	6	6	F118	OFFICIAL	LOCKERS	BRAILLE
F118/2	F118A	B3	6	8	F118A	MALE/FEMALE ISA ICON	TOILET	BRAILLE
F119/1	F119	A1	6	6	F119	OFFICE		BRAILLE
F120/1	F120	A1	6	6	F120	TRAINER		BRAILLE
F120/2	F120	A1	6	6	F119	OFFICE		BRAILLE
F120/3	F120	A1	6	6	F120	TRAINER		BRAILLE
F121/1	F121	B3	6	8	F121	FEMALE ISA ICON	FEMALE	BRAILLE
CORR	F121	E2	12	6		FEMALE ISA ICON	FEMALE	
F122/1	F122	A1	6	6	F122	CUSTODIAL		BRAILLE
F123/1	F123	B2	6	8	F123	MALE ISA ICON	MALE	BRAILLE
CORR	F123	E1	12	6		MALE ISA ICON	MALE	
MAINTENANCE BUILDING (M)								
M100/1	M100		6	6	MAINTENANCE	OFFICE		BRAILLE
M100/2	M100	A2	6	3	MEETING	ROOM		BRAILLE
M101/1	M101	A2	6	3	OFFICE			BRAILLE
M102/1	M102	A2	6	3	STORAGE			BRAILLE
M103/1	M103	B3	6	8	MALE/FEMALE ISA ICON	TOILET		BRAILLE
M104/1	M104	A2	6	3	CUSTODIAL			BRAILLE
M105/1	M105	A2	6	3	STORAGE			BRAILLE
M106/1	M106	B3	6	8	MALE/FEMALE ISA ICON	TOILET		BRAILLE

M107/1	**M107**						
M107/3	**M112**						
CONCESSION BUILDING (C)							
C100/1	**C100**	**A2**	**6**	**3**	**CONCESSION**		**BRAILLE**
C101/1	**C101**	**A2**	**6**	**3**	**CUSTODIAL**		**BRAILLE**
C102/1	**C102**	**B2**	**6**	**8**	**MALE ISA ICON**	**MALE**	**BRAILLE**
C104/1	**C104**	**B1**	**6**	**8**	**FEMALE ISA ICON**	**FEMALE**	**BRAILLE**
C105/1	**C105**	**A2**			**STORAGE**		**BRAILLE**
BATHROOM BUILDING (B)							
B100/1	**B100**	**B1**	**6**	**8**	**FEMALE ISA ICON**	**FEMALE**	**BRAILLE**
B101/1	**B101**	**B2**	**6**	**8**	**MALE ISA ICON**	**MALE**	**BRAILLE**

END OF SECTION 101423

SECTION 102113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic toilet compartments.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Blocking and supports.

B. Section 102800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2025a.

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

D. ASTM A743/A743M - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application; 2021.

E. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2025.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

I. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

K. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate work with placement of support framing and anchors in walls and ceilings.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on panel construction, hardware, and accessories.

C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall, floor, and ceiling supports, and door swings.

D. Samples: Two sample blocks, 6 by 6 inches (152 by 152 mm) in size, illustrating partition panel finish, color, and sheen.

E. Delegated Design Documents: Drawings and calculations sealed by designer.

F. Manufacturer's Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Designer's qualification statement.

H. Manufacturer's qualification statement.

I. Executed warranty.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of professional engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum 3 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver, store, and handle materials and products in accordance with manufacturer's instructions and recommendations and industry standards.

C. Do not deliver materials or begin installation until building is enclosed, with complete protection from outside weather, and building temperature maintained at minimum of 60 degrees F (15.6 degrees C).

D. Store products indoors in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect products from damage.

E. Lay cartons flat; support to ensure flatness and prevent damage to prefinished surfaces.

F. Do not store where ambient temperature exceeds 120 degrees F (49 degrees C).

1.08 FIELD CONDITIONS

A. Ambient Conditions: Maintain environmental conditions, such as temperature, humidity, and ventilation, within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 10-year manufacturer warranty for material against breakage, corrosion, and delamination. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Solid Plastic Toilet Compartments:
   1. All American Metal Corp - AAMCO: www.allamericanmetal.com/#sle.
   2. Hadrian: www.hadrian-inc.com/#sle.
   3. Metpar Corporation: www.metpar.com/#sle.
   4. Partition Systems International of South Carolina: www.psisc.com/#sle.
   5. **Scranton Products: www.scrantonproducts.com/#sle. (Basis of Design)**
   6. Substitutions: Section 016000 - Product Requirements.

2.02 DESIGN CRITERIA

A. Accessibility: Comply with ICC A117.1 and ADA Standards.

B. Fire Performance: Pass when tested in accordance with NFPA 286.

C. Surface Burning Characteristics: Flame spread index of 26 to 75 and smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.03 PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments
   1. General Description: Factory-fabricated doors, pilasters, and divider panels made of solid, molded, high-density polyethylene (HDPE); floor-mounted, headrail-braced.
   2. Color: Single color as selected, Black.
   3. Doors:
      a. Thickness: 1 inch (25 mm).

b. Width: 24 inches (610 mm).
c. Width for Handicapped Use: 36 inches (915 mm), outswinging.
d. Height: 55 inches (1397 mm).

4. Panels:
   a. Thickness: 1 inch (25 mm).
   b. Height: 55 inches (1397 mm).
   c. Depth: As indicated on drawings.
5. Pilasters:
   a. Thickness: 1 inch (25 mm).
   b. Width: As required to fit space; minimum 3 inches (76 mm).
6. Urinal Screens: Without doors; to match compartments; mounted to wall with two panel brackets.

B. Fabrication
1. Fabricate toilet compartment components to sizes indicated in shop drawings.
2. Coordinate requirements and provide cutouts for through-partition toilet accessories.
3. Provide shoes and caps at pilasters and posts to conceal anchorage, supports, and leveling mechanisms.
4. Provide manufacturer's standard corrosion-resistant supports, leveling mechanisms, anchors, and anchoring assemblies for pilasters and posts.
5. Floor-Anchored, Overhead-Braced Units: Provide supports, leveling mechanisms, and anchors at pilasters to suit floor conditions.
6. Urinal and Entrance Screen Posts: Provide anchoring assemblies with leveling adjustment at tops and bottoms of posts.

C. Materials
1. Aluminum Castings: ASTM B26/B26M.
2. Aluminum Extrusions: ASTM B221 (ASTM B221M).
3. High-Density Polyethylene (HDPE):
   a. Composition: Formed from waterproof, nonabsorbent, HDPE resins.
   b. Properties: Mark-resistant, self-lubricating surface.
   c. Material Fire Ratings: ICC (IBC), Class B.
4. Stainless Steel Sheet, Plate, and Bar: ASTM A240/A240M or ASTM A666/A666M, Type 304, stretcher-leveled standard of flatness.
5. Stainless Steel Castings: ASTM A743/A743M.

2.04 ACCESSORIES

A. Pilaster Shoes: Stainless steel, satin finish, 3 inches (76 mm) high; concealing floor fastenings.
1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

B. Headrails: Extruded aluminum, anti-grip profile.
1. Size: Manufacturer's standard size.

C. Wall and Pilaster Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.

D. Attachments, Screws, and Bolts: Stainless steel, tamper-proof type.
1. Bracket Attachment to Panels and Pilasters: Through-bolts and nuts; tamper proof.

E. Hinges: Stainless steel, manufacturer's standard finish.
1. Continuous-type hinge, self-closing.

F. Door Hardware: Stainless steel, manufacturer's standard finish.
1. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
2. Provide door pull for outswinging doors.

G. Coat Hook: One per compartment, mounted on door.

H. Toilet Accessories: See Section 102800.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and interfaces with other work.

B. Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

C. Verify spacing of and between plumbing fixtures.

D. Verify location of built-in framing, anchorage, and bracing.

E. Verify substrate and site conditions for product installation are installed in accordance with manufacturer's written instructions.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's written instructions.

B. Maintain 3/8-to-1/2-inch (10 to 12 mm) space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate headrail joints at pilaster center lines.

E. Replace damaged or scratched materials with new materials. Do not touch up scratches or damaged finish in field.

3.03 TOLERANCES

A. Maximum Variation from True Position: 1/4 inch (6 mm).

B. Maximum Variation from Plumb: 1/8 inch (3 mm).

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).

B. Adjust hinges to position doors in partially open position when unlatched. Return outswinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION 102113.19

SECTION 102239
FOLDING PANEL PARTITIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Top-supported folding panel partitions, horizontal opening.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Wood blocking and track support shimming.

B. Section 087100 - Door Hardware: Lock cylinders for panels

C. Section 101100 - Visual Display Units: Product requirements for markerboard finish for installation by this section.

D. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections; control buttons .

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2024.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

E. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

F. ASTM E413 - Classification for Rating Sound Insulation; 2022.

G. ASTM E557 - Standard Guide for Architectural Design and Installation Practices for Sound Isolation Between Spaces Separated by Operable Partitions; 2012 (Reapproved 2026).

H. ASTM F793/F793M - Standard Classification of Wall Coverings and Ceiling Coverings by Use Characteristics; 2025.

I. NEMA MG 00001 - Motors and Generators; 2024.

J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene at project site seven calendar days prior to scheduled beginning of construction activities of this section to review section requirements.
   1. Require attendance by representatives of installer.
   2. Notify Architect four calendar days in advance of scheduled meeting date.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on partition materials, operation, hardware and accessories, electric operating components, track switching components, and colors and finishes available.

C. Design Data: Design calculations, bearing seal and signature of structural engineer licensed to practice in the State in which the Project is located, showing loads at points of attachment to the building structure.

D. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, static and dynamic loads, location and details of pass door and frame, adjacent construction and finish trim, and stacking depth.

E. Samples for Selection: Submit two samples of full manufacturer's color range for selection of colors.

F. Samples for Review: Submit two samples of surface finish, 12 by 12 inches (300 by 300 mm) size, illustrating quality, colors selected, texture, and weight.

G. Certificates: Certify that partition system meets or exceeds specified acoustic requirements.

H. Manufacturer's Instructions: Indicate special procedures.

I. Designer's qualification statement.

J. Manufacturer's qualification statement.

K. Installer's qualification statement.

L. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until installation.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against defects in material and workmanship, excluding abuse.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Folding Panel Partitions - Horizontal Opening:
   1. Kwik-Wall Company: www.kwik-wall.com/#sle.
   2. Moderco, Inc: www.moderco.com/#sle.
   3. **Modernfold, a DORMA Group Company; Acousti-Seal Premier - Continuous Hinged (933E): www.modernfold.com/#sle. (Basis of Design)**
   4. Substitutions: See Section 016000 - Product Requirements.

2.02 FOLDING PANEL PARTITIONS - HORIZONTAL OPENING

A. Folding Panel Partitions: Center opening; continuous hinged panels; center stacking; motor operated.

B. Panel Construction:
   1. Frame: 18 gauge, 0.0478 inch (1.2 mm) thick formed sheet steel frame top, bottom, jambs, and intermediates; welded construction, with acoustical insulation fill.
   2. Substrate: Medium-density fiberboard.
   3. Panel Substrate Facing: Steel sheet, manufacturer's standard thickness.
   4. Hinges: Full leaf butt hinges, attached directly to panel frame with welded hinge anchor plates within panel to further support hinge mounting to frame. Lifetime warranty on hinges. Hinges mounted into panel edge or vertical astragal are not acceptable.

5. Hardware: Latching door handles of cast steel, satin chrome finish; lock cylinder keyed to building keying system; pull bars.
   a. Refer to Section 087100 for additional requirements.
6. Panel Properties:
   a. Thickness With Finish: 3 inches (75 mm).
   b. Width: Equal widths.
   c. Weight: 8 lb/sq ft (40 kg/sq m).

C. Panel Finishes:
1. Facing: Vinyl coated fabric.

D. Panel Seals:
1. Panel to Panel Seals: Grooved and gasketed astragals, with continuous flexible ribbed vinyl seal fitted to panel edge construction; color to match panel finish.
2. Acoustic Seals: Flexible acoustic seals at jambs, meeting mullions, ceilings, retractable floor and ceiling seals, and above track to structure acoustic seal.

E. Suspension System:
1. Track: Formed steel; 1-1/4 by 1-1/4 inch (32 by 32 mm) size; thickness and profile designed to support loads, steel sub-channel and track connectors, and track switches.
2. Carriers: Steel, ball bearing wheels on trolley carrier at top of every second panel, sized to carry imposed loads, with threaded pendant bolt for vertical adjustment.

F. Performance:
1. Acoustic Performance:
   a. Sound Transmission Class (STC): 48 to 52 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90, on panel size of 100 sq ft (9.3 sq m).
2. Surface Burning Characteristics of Panel Finish: Flame spread/smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84.
3. Installed partition system track capable of supporting imposed loads, with maximum deflection of 1/360 of span.

G. Operation:
1. Electric Operator: 12 inches (300 mm) per second traveling speed; adjustable friction clutch brake actuated by solenoid controlled motor starter; enclosed limit switch; enclosed magnetic reversing starter.
   a. Motor: NEMA MG 1 Class A.
2. Control Station: One standard keyed, three button OPEN-STOP-CLOSE type; 24 volt circuit; surface mounted.
   a. Key switch prepared for mortise lock cylinder.
   b. Key switches alike.
3. Safety Features:
   a. Limit Switches: Automatic type, at both extremes of travel, to prevent over-travel.
   b. Emergency Release: Mechanism to disengage motor drive system and permit manual operation.
   c. Pocket Door Interlock: Mechanism to prevent operation of panels unless storage pocket doors are fully open.
4. Electrical Requirements:
   a. 1 hp (750 W), 7.0 rated load amperes.
   b. 208/230 volts, single phase, 60 Hz.
   c. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
   d. Disconnect Switch: Factory mount disconnect switch in control panel.

H. Accessories:

1. Ceiling Closure: White enameled ceiling closure; aluminum jamb and head molding, fittings and attachments, and intermediate meeting posts.
2. Pocket Enclosures: Door, frame, and trim to match adjacent walls.
   a. Modernfold, a DORMA Group Company; Premier - Type III: www.modernfold.com/#sle. (Basis of Design)
3. Pass Door: Single door, 36 inch (914.4 mm) wide by 84 inch (2133.6 mm) high opening; same design and construction as panel; fit door with perimeter acoustic gaskets, concealed closer, and keyed lock.
   a. ADA-compliant pass door to be trimless and equipped with friction latch and flush pulls for panic operation. No threshold will be permitted.
4. Markerboard: White enamel on steel, bonded to the face of the panel with horizontal trim without exposed fasteners. Trim is not acceptable on vertical edges to provide uninterrupted work surface.
   a. Size: 48 inch (1219.2 mm) high, by full width of panel, both sides.
5. Acoustic Sealant: As recommended by partition manufacturer.

2.03 MATERIALS

A. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Standard Gypsum Board: ASTM C1396/C1396M, 3/8 inch (9.5 mm) thick, maximum permissible length; ends square cut, square edges.

C. Vinyl Coated Fabric: ASTM F793 Category VI, polyvinyl fluoride (PVC) finish for washability and improved flame retardance; color as selected by Architect from manufacturer's standard range.

D. Markerboard: Porcelain enamel on steel, laminated to core; color as selected.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that required utilities are available, of the correct characteristics, in proper location, and ready for use.

C. Verify track supports are laterally braced and will permit track to be level within 1/4 inch (6.4 mm) of required position and parallel to the floor surface.

D. Verify floor flatness of 1/8 inch in 10 feet (3 mm in 3 m), non-cumulative.

E. Verify wall plumbness of 1/8 inch in 10 feet (3 mm in 3 m), non-cumulative.

3.02 INSTALLATION

A. Install partition in accordance with manufacturer's instructions and ASTM E557.

B. Install electric operator, wiring, and controls. Locate control station(s) as indicated.

C. Fit and align partition assembly and pocket doors level and plumb.

D. Lubricate moving components.

E. Install acoustic sealant to achieve required acoustic performance.

F. Coordinate electrical connections.

3.03 ADJUSTING

A. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.

B. Visually inspect partition in full extended position for light leaks to identify a potential acoustical leak.

C. Adjust partition assembly to achieve lightproof seal.

3.04 CLEANING

A. Clean finish surfaces and partition accessories.

B. Condition markerboard surfaces in accordance with manufacturer's instructions.

3.05 CLOSEOUT ACTIVITIES

A. Demonstrate operation of partition and identify potential operational problems.

END OF SECTION 102239

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SECTION 102600
WALL AND DOOR PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Corner guards.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Blocking for wall and corner guard anchors.

B. Section 087100 - Door Hardware: Standard protection plates and trim.

C. Section 092116 - Gypsum Board Assemblies: Placement of supports in stud wall construction.

1.03 REFERENCE STANDARDS

A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2024.

B. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

D. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2023.

E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.

C. Shop Drawings: Include plans, elevation, sections, and attachment details. Show design and spacing of supports for protective corridor handrails, required to withstand structural loads.

D. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
   1. Submit two sections of corner guards, 24 inches (610 mm) long.

E. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

G. Maintenance Data: Manufacturer's instructions for care and cleaning of each type of product. Include information about both recommended and potentially detrimental cleaning materials and methods.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.

B. Protect work from moisture damage.

C. Protect work from UV light damage.

D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.

E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 5-year manufacturer warranty for metal crash rails. Complete forms in Owner's name and register with manufacturer.
   1. Failures include, but are not limited to, the following:
      a. Structural failures or internal connection failures.
      b. Deterioration of materials beyond that expected of normal use, as intended by manufacturer.

C. Installer Warranty: Provide 5-year warranty for metal crash rails commencing on Date of Substantial Completion. Complete forms in Owner's name and register with installer.
   1. Failures include, but are not limited to, the following:

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Corner Guards:
   1. Construction Specialties, Inc: www.c-sgroup.com/#sle.
   2. Inpro: www.inprocorp.com/#sle.
   3. Koroseal Interior Products: www.koroseal.com/#sle.
   4. Wallprotex: www.wallprotex.com/#sle.
   5. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE CRITERIA

A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.

B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.

C. Fungal Resistance: Unless otherwise noted, provide protection products and assemblies which pass ASTM G21 testing.

2.03 PRODUCT TYPES

A. Corner Guards CG-1 - Surface Mounted:
   1. Basis of Design: inpro 160 High Impact Corner Guard.
   2. Material: High impact vinyl with full height extruded aluminum retainer.
   3. Thickness: 0.075 inch (1.9 mm).
   4. Performance: Resist lateral impact force of 100 lbs (445 N) at any point without damage or permanent set.
   5. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
   6. Width of Wings: 2 inches (51 mm).
   7. Corner: Radiused.
   8. Color: As selected from manufacturer's standard colors.
   9. Length: One piece, 48 inches (1219 mm).
   10. Mounting: Countersunk screws through factory-drilled holes.
   11. Preformed end caps.

B. Doorway Protection:
   1. See Section 087100 - Door Hardware for standard protective plates and trim.

C. Adhesives and Primers: As recommended by manufacturer.

D. Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.

E. See Section 061053 for wood blocking for wall and corner guard anchors.

F. See Section 092116 for supports in stud wall construction.

2.04 FABRICATION

A. Fabricate components with tight joints, corners and seams.

B. Pre-drill holes for attachment.

C. Form end trim closure by capping and finishing smooth.

2.05 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

B. Verify that field measurements are as indicated on drawings.

C. Verify that substrate surfaces for adhered items are clean and smooth.

1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer. Follow adhesive manufacturer's recommendations for remedial measures at locations and/or application conditions where adhesion test's results are unsatisfactory.

D. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.

B. Position corner guard 4 inches (102 mm) above finished floor to 72 inches high (1828.8 mm high).

3.03 TOLERANCES

A. Maximum Variation From Required Height: 1/4 inch (6 mm).

B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch (6 mm).

3.04 CLEANING

A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

B. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION 102600

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SECTION 102800
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Commercial shower and bath accessories.

C. Under-lavatory pipe covers.

D. Electric hand/hair dryers.

E. Diaper changing stations.

F. Utility room accessories.

1.02 RELATED REQUIREMENTS

A. Section 088300 - Mirrors: Other mirrors.

B. Section 102113.19 - Plastic Toilet Compartments.

1.03 ABBREVIATIONS AND ACRONYMS

A. PETG: Polyethylene Terephthalate Glycol.

B. PPE: Personal Protective Equipment.

1.04 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

C. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2025.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

E. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

F. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017 (Reapproved 2022).

G. ASTM C1036 - Standard Specification for Flat Glass; 2025.

H. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

I. ASTM D4802 - Standard Specification for Poly(Methyl Methacrylate) Acrylic Plastic Sheet; 2016 (Reapproved 2024).

J. ASTM D5047 - Standard Specification for Polyethylene Terephthalate Film and Sheeting; 2017 (Reapproved 2023).

K. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2022.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Samples: Submit two samples of each accessory, illustrating color and finish.

D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
1. American Specialties, Inc: www.americanspecialties.com/#sle.
2. Bobrick; : www.bobrick.com/.
3. Bradley Corporation: www.bradleycorp.com/#sle.
4. Georgia-Pacific Professional: www.gppro.com/#sle.
5. Kimberly-Clark Corporation: www.kcprofessional.com/#sle.
6. Palmer Fixture: www.palmerfixture.com/#sle.
7. Substitutions: Section 016000 - Product Requirements.

B. Under-Lavatory Pipe Covers:
1. Trubro 2018, see Plumbing for fixture schedule..
2. Substitutions: Section 016000 - Product Requirements.

C. Electric Hand/Hair Dryers:
1. American Specialties, Inc: www.americanspecialties.com/#sle.
2. Dyson Inc: www.dyson.com/#sle.
3. Excel Dryer: www.exceldryer.com/#sle.
4. Frost Products Limited: www.frostproductsltd.com/#sle.
5. Mitsubishi Electric Trane HVAC US LLC: www.mitsubishielectric.com/#sle.
6. Saniflow Hand Dryer Corporation: www.saniflowcorp.com/#sle.
7. Stelpro Design Inc: www.stelpro.com/#sle.
8. World Dryer Corporation: www.worlddryer.com/#sle.
9. Substitutions: Section 016000 - Product Requirements.

D. Diaper Changing Stations:
1. American Specialties, Inc: www.americanspecialties.com/#sle.
2. Bradley Corporation: www.bradleycorp.com/#sle.
3. Diaper Deck & Company: www.diaperdeck.com/#sle.
4. Koala Kare Products: www.koalabear.com/#sle.
5. Saniflow Hand Dryer Corporation: www.saniflowcorp.com/#sle.
6. Safe-Strap Company, Inc: www.diaperdepot.com/#sle.
7. Sova by Foundations: www.choosesova.com/#sle.
8. Substitutions: 016000 - Product Requirements.

E. Provide products of each category type by single manufacturer.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
1. Grind welded joints smooth.
2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.

B. Keys: Provide 6 keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666/A666M, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

F. Acrylic Plastic Sheet: ASTM D4802.

G. PETG Plastic Sheet: ASTM D5047.

H. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

I. Adhesive: Two component epoxy type, waterproof.

J. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

K. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.

C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

D. Powder-Coated Steel: Clean, degrease, and neutralize. Follow immediately with a phosphatizing treatment, prime coat, and two finish coats of powder coat enamel.

E. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

F. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

G. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 COMMERCIAL TOILET ACCESSORIES

A. Toilet Paper Dispenser (A): Double roll, surface mounted bracket type, stainless steel, spindleless type for tension spring delivery designed to prevent theft of tissue roll.
   1. Products:
      a. Bobrick B-2892.
      b. Substitutions: Section 016000 - Product Requirements.

B. Soap Dispenser (B): Soap lather dispenser, wall-mounted, surface.
   1. Minimum Capacity: 1 liter.
   2. Products:
      a. SCJ Professional; Proline 1L; TPB1LDS.
      b. Substitutions: Not permitted.

C. Mirrors (G): Stainless steel framed, 1/4 inch (6 mm) thick tempered safety glass; ASTM C1048.
   1. Size: _____.
   2. Frame: 0.05 inch (1.3 mm)angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
   3. Backing: Full-mirror sized, minimum 0.03 inch (0.8 mm) galvanized steel sheet and nonabsorptive filler material.
   4. Products:
      a. Bobrick B-165 1830.
      b. Substitutions: Section 016000 - Product Requirements.

D. Grab Bars (C, D, E & M): Stainless steel, peened surface.
   1. Standard Duty Grab Bars:
      a. Push and Pull Point Load: Minimum 250 lbf (1112 N).
      b. Dimensions: 1-1/4 inch (32 mm) outside diameter, minimum 18-gauge, 0.05-inch (1.02 mm) steel thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
      c. Finish: Satin.
      d. Length and Configuration: As indicated on drawings.
         1) Bobrick B-68069x42 (C).
         2) Bobrick B-6806x36 (D).
         3) Bobrick B-6806x18 (E)

4) Bobrick B6861 (M).
e. Products:
1) Bobrick B-6806.
2) Substitutions: Section 016000 - Product Requirements.

E. Sanitary Napkin Disposal Unit (F): Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
1. Products:
a. Bobrick B-270.
b. Substitutions: Section 016000 - Product Requirements.

2.05 COMMERCIAL SHOWER AND BATH ACCESSORIES

A. Shower Curtain Rod (N): Stainless steel tube, 1 inch (25 mm) outside diameter, 0.04 inch (1.0 mm) wall thickness, satin-finished, with 3 inch (75 mm) outside diameter, minimum 0.04 inch (1.0 mm) thick satin-finished stainless steel flanges, for installation with exposed fasteners.
1. Products:
a. Bobrick B-207 x 36.
b. Substitutions: Section 016000 - Product Requirements.

B. Shower Curtain (N):
1. Material: Opaque vinyl, 0.008 inch (0.2 mm) thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
2. Size: 36 by 72 inches (914 by 1830 mm), hemmed edges.
3. Grommets: Stainless steel; pierced through top hem on 6 inch (150 mm) centers.
4. Color: White.
5. Shower Curtain Hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
6. Products:
a. Bobrick B-204-1.
b. Bobrick B-204-2.
c. Substitutions: Section 016000 - Product Requirements.

C. Folding Shower Seat (P): Wall-mounted surface; welded tubular seat frame, structural support members, swing-down legs, hinges, and mechanical fasteners of Type 304 stainless steel, L-shaped, right hand seat.
1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of color as selected.
2. Size: ADA Standards compliant.
3. Products:
a. Bobrick B-5181.
b. Substitutions: Section 016000 - Product Requirements.

D. Towel Pin (R): Stainless steel, 3 inch (75 mm) extension from wall; rectangular-shaped bracket and backplate for concealed attachment, satin finish.
1. Products:
a. Bobrick B-6777.
b. Substitutions: Section 016000 - Product Requirements.

E. Wall Hook (L): Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
1. Products:
a. Bobrick B-76717..
b. Substitutions: Section 016000 - Product Requirements.

2.06 UNDER-LAVATORY PIPE COVERS

A. Under-Lavatory Pipe Covers (H):
1. Products:
a. Trubro 2018, see Plumbing for fixture schedule..

b. Substitutions: See Section 016000 - Product Requirements.

2.07 ELECTRIC HAND DRYERS

A. Electric Hand Dryers (K):
1. Operation: Automatic, sensor-operated on and off.
2. Mounting: Wall-mounted - surface.
3. Cover: Stainless steel with brushed finish.
a. Tamper-resistant screw attachment of cover to mounting plate.
4. Air Velocity: 18,000 linear feet per minute (91 m/s), minimum, at full power.
5. Heater: 500 W, minimum, at full power.
6. Fan/Heater Control: Field adjustable down to approximately half-speed with corresponding reduction in heat output.
7. Total Wattage: 1400 W, maximum.
8. Runtime: Field adjustable or automatic, up to 35 seconds.
9. Supply Voltage: As indicated on drawings.
10. Warranty: 3 years.
11. Electric Hand Dryer Products:
a. Dyson Inc; Dyson Airblade V AB12: www.dyson.com/#sle.
b. Substitutions: Section 016000 - Product Requirements.

2.08 DIAPER CHANGING STATIONS

A. Diaper Changing Station (J): Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
1. Material: Polyethylene.
2. Mounting: Surface.
3. Color: Gray.
4. Minimum Rated Load: 250 pounds (113.4 kg).
5. Products:
a. Koala Kare KB300-01.
b. Substitutions: 016000 - Product Requirements.

2.09 UTILITY ROOM ACCESSORIES

A. Combination Utility Shelf/Mop and Broom Holder (S): 0.05 inch (1.3 mm) thick stainless steel, Type 304, with 1/2 inch (12 mm) returned edges, 0.06 inch (1.6 mm) steel wall brackets.
1. Drying rod: Stainless steel, 1/4 inch (6 mm) diameter.
2. Hooks: Three, 0.06 inch (1.6 mm) stainless steel rag hooks at shelf front.
3. Mop/broom holders: Four spring-loaded rubber cam holders at shelf front.
4. Length: 36 inches (900 mm).
5. Products:
a. Bobrick B-224.
b. Substitutions: 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.

D. Verify that field measurements are as indicated on drawings.

E. See Section _____ for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
   1. Electric Hand Dryers: Measured from floor to bottom of nozzle:
      a. Men: 44 inches (1110 mm).
      b. Women: 42 inches (1060 mm).
      c. Teenager: 41 inches (1035 mm).
      d. Child: 32 inches (810 mm).
      e. Handicap: 36 inches (910 mm).

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION 102800

SECTION 104400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Wood blocking.

1.03 REFERENCE STANDARDS

A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2024.

B. NFPA 10 - Standard for Portable Fire Extinguishers; 2026.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide extinguisher operational features.

C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.

D. Manufacturer's Instructions: Indicate special criteria and wall opening coordination requirements.

E. Operation and Maintenance Data: Include test, refill, or recharge schedules and recertification requirements.

1.05 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature causes freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguishers:
1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com/#sle.
2. Ansul, a Tyco Business: www.ansul.com/#sle.
3. Fire-End & Croker Corporation: www.croker.com/#sle.
4. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
5. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
6. Oval Brand Fire Products: www.ovalfireproducts.com/#sle.
7. Potter-Roemer: www.potterroemer.com/#sle.
8. Pyro-Chem, a Tyco Business: www.pyrochem.com/#sle.
9. Substitutions: See Section 016000 - Product Requirements.

B. Fire Extinguisher Cabinets and Accessories:
1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com/#sle.
2. Fire-End & Croker Corporation: www.croker.com/#sle.
3. **JL Industries: www.activarcpg.com/. (Basis of Design)**
4. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
5. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
6. Oval Brand Fire Products: www.ovalfireproducts.com/#sle.
7. Potter-Roemer: www.potterroemer.com/#sle.
8. The Williams Brothers Corporation of America: www.wbdoors.com/#sle.
9. Substitutions: See Section 016000 - Product Requirements.

2.02 FIRE EXTINGUISHERS

A. General Requirements: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

B. Multipurpose Dry-Chemical-Type Fire Extinguishers (FE-1): Aluminum tank, with pressure gauge.
   1. Cartridge Operated: Spun shell.
   2. Class: A:B:C.
   3. Size: 5 pound (2.27 kg).
   4. Finish: Baked polyester powder coat, color as selected.
   5. Temperature Range: Minus 65 to 120 degrees F (Minus 54 to 49 degrees C).
   6. Products: JL Industries - Cosmic FE05C.

2.03 FIRE EXTINGUISHER CABINETS

A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire-resistance rating of walls where cabinet installed.

B. Cabinet Construction FEC-1: Non-fire rated.
   1. Formed stainless steel sheet; 0.036 inch (0.9 mm) thick base metal.
   2. JL Industries - Cosmopolitan 1037.
   3. Substitutions: See Section 016000 - Product Requirements.

C. Fire-Rated Cabinet Construction FEC-2: One-hour fire rated.
   1. Steel; double wall or outer and inner boxes with 5/8-inch (16 mm) thick fire barrier material.
   2. JL Industries - Cosmopolitan 1037.
   3. Substitutions: See Section 016000 - Product Requirements.

D. Cabinet Configuration: Semi-recessed type.
   1. Size to accommodate accessories.
   2. Exterior nominal dimensions of 12 inches (305 mm) wide by 30 inches (762 mm) high by 10 inches (254 mm) deep.
   3. Trimless type.
   4. Trim: Flat rolled edge, with 3 inch (76.2 mm) wide face.
   5. Provide cabinet enclosure with right-angle inside corners and seams and with formed perimeter trim and door stiles.

E. Door: 20-gauge, 0.036-inch (0.9 mm) metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180-degree opening with two butt hinges.

F. Door Glazing: Tempered glass, clear, 1/8 inch (3 mm) thick, and set in resilient channel glazing gasket.

G. Cabinet Mounting Hardware: Appropriate to cabinet, with predrilled holes for placement of anchors.

H. Fabrication: Weld, fill, and grind components smooth.

I. Finish of Cabinet Exterior Trim and Door: No.4 - Brushed stainless steel.

J. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

B. Lettering: FIRE EXTINGUISHER text on decal or self-adhesive vinyl, prespaced black lettering in accordance with authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and interfaces with other work.

B. Verify substrate and site conditions for product installation are in accordance with manufacturer's written instructions.

C. Verify rough openings for cabinet are sized and located in accordance with manufacturer's written instructions.

D. Notify Architect in writing of conditions detrimental to completion of work. Do not proceed with installation until detrimental conditions are corrected.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, 42 inches (1067 mm) from finished floor to inside bottom of cabinet.

C. Secure rigidly in place.

D. Place extinguishers and accessories in cabinets.

3.03 MAINTENANCE

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Provide separate maintenance contract for specified maintenance service.

C. Provide separate maintenance contract for service and maintenance of fire extinguishers and fire extinguisher cabinets for 2 years from mm-dd-yyyy.

END OF SECTION 104400

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SECTION 105113
METAL LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal lockers.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Concrete base construction.

B. Section 061000 - Rough Carpentry: Wood blocking and nailers.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2025a.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2025.

E. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's published data on locker construction, sizes, and accessories.

C. Shop Drawings: Indicate locker plan layout, numbering plan and combination lock code.

D. Samples: Submit two samples 3 by 6 inches (75 by 150 mm) in size showing color and finish of metal locker material.

E. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Lockers:
1. Art Metal Products: www.artmetalproducts.com/#sle.
2. ASI Storage Solutions: www.asi-storage.com/#sle.
3. Best Access Doors: www.bestaccessdoors.com/#sle.
4. DeBourgh Manufacturing Co: www.debourgh.com/#sle.
5. Hadrian: www.hadrian-inc.com/#sle.
6. List Industries, Inc: www.listindustries.com/#sle.
7. Lockers MFG: www.lockersmfg.com/#sle.
8. Lyon Workspace Products: www.lyonworkspace.com/#sle.
9. **Penco Products, Inc; Vanguard: www.pencoproducts.com/#sle. (Basis of Design)**
10. Republic Storage Systems Co: www.republicstorage.com/#sle.
11. Spacesaver Corporation: www.spacesaver.com/#sle.
12. Tennsco Storage: www.tennsco.com/#sle.
13. WEC Manufacturing: www.itswec.com/#sle.
14. Substitutions: See Section 016000 - Product Requirements.

2.02 LOCKER APPLICATIONS

A. Wardrobe Lockers (WL-1): Metal lockers, wall mounted with matching closed base.
   1. Width: 12 inches (305 mm).
   2. Depth: 12 inches (305 mm).
   3. Height: 72 inches (1830 mm).
   4. Configuration: Single tier.
   5. Fittings: Size and configuration as indicated on drawings.
      a. Hat shelf.
      b. Single shoe shelf.
      c. Hooks: Two single prong.
   6. Ventilation: Louvers at top and bottom of door panel.
   7. Locking: Padlock hasps, for padlocks provided by Owner.
   8. Provide sloped top.
   9. Color: To be selected from manufacturer's full range by Architect.

B. Wardrobe Lockers (WL-2): Metal lockers, wall mounted with matching closed base.
   1. Width: 12 inches (305 mm).
   2. Depth: 12 inches (305 mm).
   3. Height: 72 inches (1830 mm).
   4. Configuration: Two tier.
   5. Fittings: Size and configuration as indicated on drawings.
      a. Hooks: Two single prong.
   6. Ventilation: Louvers at top and bottom of door panel.
   7. Locking: Padlock hasps, for padlocks provided by Owner.
   8. Provide sloped top.
   9. Color: To be selected from manufacturer's full range by Architect.

2.03 METAL LOCKERS

A. Accessibility: Design units indicated on drawings as 'accessible' to comply with ICC A117.1 and ADA Standards.

B. Locker Case Construction:
   1. Heavy-Duty, Knocked Down Construction: Made of formed sheet steel; metal edges finished smooth without burrs; baked enamel or powder coat finished inside and out.
      a. Locker Body Components: Formed and flanged from steel sheet of the following type and minimum thicknesses:
         1) Unperforated Steel Sheet: Commercial Steel (CS), Type B, supplied for exposed applications and complying with ASTM A1008/A1008M and the following:
            (a) Zinc-Coated by the Hot-Dip Process: Comply with ASTM A653/A653M, coating designation G60/Z180.
         2) Body and Shelves: 24 gauge, 0.0239 inch (0.61 mm).
         3) Backs: 24 gauge, 0.0239 inch (0.61 mm).
         4) Base: 18 gauge, 0.0478 inch (1.21 mm).
            (a) Height: 4 inch (100 mm).
      b. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
         1) Door Frame: 16 gauge, 0.0598 inch (1.52 mm), minimum.
      c. Where ends or sides are exposed, provide flush panel closures.
      d. Provide filler strips where indicated, securely attached to lockers.

C. Doors: Channel edge; welded construction, manufacturer's standard stiffeners, grind and finish edges smooth.
   1. Door Thickness: 16 gauge, 0.0598 inch (1.52 mm), minimum.
   2. Form recess for operating handle and locking device.

D. Latches and Door Handles: Manufacturer's standard.

1. Latching Components: 300 Series Stainless Steel (ASTM A240/A240M).
2. Latching: Manufacturer's standard for locking arrangement selected.
    a. Three-Point Lift Handle Gravity Latch: Pocket-mounted, provide for doors 18 inches (457 mm) or taller.
        1) Handle Pocket, Recess: Stainless steel flush-mounted cup recessed into face of door.
        2) Handle: Steel finger lift mechanism with exposed portion encased in molded plastic trigger.
            (a) Padlock Eye: Integral with lift trigger, sized for use with 9/32 inch (7.1 mm) diameter padlock shackles.
        3) Latching Mechanism: Spring activated nylon slide latch enclosed in steel latch channel allows closing of door while padlock or built-in lock is in position.
        4) Lock Hole Filler Plate: Manufacturer's standard. Provide for lockers intended to be unsecured or secured with padlocks.
        5) Rubber bumpers riveted to door stops for silent operation.

E. Hinges: Continuous piano hinge with powder coat finish to match locker color.

F. Sloped Top: 20 gauge, 0.0359 inch (0.91 mm), with closed ends.

G. Trim: 20 gauge, 0.0359 inch (0.91 mm).

H. Coat Hooks: Stainless steel or zinc-plated steel.

I. Number Plates: Provide rectangular shaped aluminum plates. Form numbers 1 inch (25.4 mm)1 high of block font style with ADA designation, in contrasting color.

J. Locks: Locker manufacturer's standard type indicated in Applications article above.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Place and secure on prepared base.

C. Install lockers plumb and square.

D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds (445 N).

E. Bolt adjoining locker units together to provide rigid installation.

F. Install end panels, filler panels, and sloped tops.

G. Install fittings if not factory installed.

H. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION 105113

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SECTION 105129
PHENOLIC LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Phenolic lockers.

B. Locker benches.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry Wood blocking and nailers.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.

C. Shop Drawings: Indicate locker plan layout, numbering plan and combination lock code.

D. Samples: Submit two samples 3 by 6 inches (75 by 150 mm) in size, of each color scheduled.

E. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Phenolic Lockers:
   1. ASI Storage Solutions: www.asi-storage.com/#sle.
   2. Columbia Lockers, a division of PSiSC; _____: www.psisc.com/#sle.
   3. **Foreman Locker Systems: www.foremanlockers.com (Basis of Design)**
   4. Grid: www.builtbygrid.com/#sle.
   5. List Industries, Inc: www.listindustries.com/#sle.
   6. Summit Lockers, Inc: www.summitlockers.com/#sle.
   7. Substitutions: See Section 016000 - Product Requirements.

2.02 LOCKER APPLICATIONS

A. Open-Front Athletic Lockers (AL-1): Phenolic lockers, wall mounted with matching closed base.
   1. Accessibility: Comply with ICC A117.1 and ADA Standards, locations as indicated on drawings.
   2. Width: 36 inches (914 mm).
   3. Depth: 20 inches (508 mm).
   4. Height: 84 inches (2134 mm).
   5. Locker Configuration: Single tier.
   6. Fittings: Size and configuration as indicated on drawings.
      a. Upper compartment:
         1) Lock box/safe with padlock hasp, for padlock by Owner.
         2) Small open cubby.
      b. Coat rod.
      c. Hooks: Four single prong.

d. Footlocker with hinged top/seat.
    1) Upholstered seat pad.
    2) Vebtilation screen.
e. Single shoe shelf.

7. Locking: Padlock hasps, for padlocks provided by Owner.
8. Manufacturers:
    a. Foreman Locker Systems; Varsity Series.
    b. Substitutions: See Section 016000 - Product Requirements.

B. Open-Front Athletic Lockers (AL-2): Phenolic lockers, wall mounted with matching closed base.
1. Accessibility: Comply with ICC A117.1 and ADA Standards, locations as indicated on drawings.
2. Width: 24 inches (610 mm).
3. Depth: 20 inches (508 mm).
4. Height: 84 inches (2134 mm).
5. Locker Configuration: Single tier.
6. Fittings: Size and configuration as indicated on drawings.
    a. Upper Compartment:
    b. Lock box/safe with padlock hasp, for padlock by Owner.
        1) Small open cubby.
        2) Lock box/safe with padlock hasp, for padlock by Owner.
    c. Hooks: Four single prong.
    d. Footlocker with hinged top/seat.
7. Locking: Padlock hasps, for padlocks provided by Owner.
8. Manufacturers:
    a. Foreman Locker Systems; Varsity Series.
    b. Substitutions: See Section 016000 - Product Requirements.

C. Locker Benches: Stationary type; bench top of phenolic material; satin stainless steel pedestals.
1. Accessibility: Comply with ICC A117.1 and ADA Standards.
2. Height: 18 inch (457.2 mm).
3. Depth: 24 inch (608 mm).
4. Length: 48 inch (1216 mm).
5. Manufacturers:
    a. Foreman Locker Systems.
    b. Substitutions: See Section 016000 - Product Requirements.

D. Locker Benches: Stationary type; bench top of phenolic material; satin stainless steel pedestals.
1. Height: 18 inch (457.2 mm).
2. Depth: 12 inch (304.2 mm).
3. Length: As indicated on drawings.
4. Manufacturers:
    a. Foreman Locker Systems.
    b. Substitutions: See Section 016000 - Product Requirements.

2.03 PHENOLIC LOCKERS

A. Lockers: Factory assembled, made of phenolic core panels with mortise and tenon joints and stainless steel mechanical joint fasteners; fully finished inside and out; each locker capable of standing alone.
1. Doors: Full overlay, covering full width and height of locker body; square edges.
2. Panel Core Exposed at Edges: Machine polished, without chips or tool marks; square edge unless otherwise indicated.

3. Where locker ends or sides are exposed, finish the same as fronts or provide extra panels to match fronts.
4. Provide filler strips where indicated, securely attached to lockers.
5. Color: As selected by Architect.
6. Fasteners for Accessories and Locking Mechanisms: Tamperproof type.

B. Component Thicknesses:
1. Doors: 3/8 inch (10 mm) minimum thickness.
2. Locker Body: One of the following combinations:
a. Tops, bottoms, shelves, sides and backs3/8 inch (10 mm) ; minimum.
3. End Panels and Filler Panels: 3/8 inch (10 mm) minimum thickness.
4. Toe Kick Plates: 3/8 inch (10 mm) minimum thickness.

C. Phenolic Core Panels: Nonporous phenolic resin and paper core formed under high pressure, with natural colored finished edges, integral melamine surface, matte finish, and uniform surface appearance; glued laminated panels not acceptable.
1. Surface Burning Characteristics: Flame spread index of 75 or less, and smoke developed index of 450 or less; when tested in accordance with ASTM E84.

D. Hinges: Stainless steel, black powder coat finish; minimum of 180 degree opening; either exposed barrel 5-knuckle hinge attached to back of door and inside of body with tamperproof screws, or concealed cabinetwork style hinge attached with tamperproof screws.

E. Coat Hooks: Stainless steel or reinforced nylon; attached with tamperproof screws.

F. Number Plates: Manufacturer's standard, minimum 4-digit, permanently attached with adhesive; may be field installed.

G. Locks: Locker manufacturer's standard type indicated above.

H. Built-In Lock Boxes: Same material as locker, manufacturer's standard size, with padlock hasps, for padlocks provided by Owner.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Place and secure on prepared base.

C. Install lockers plumb and square.

D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds (445 N).

E. Bolt adjoining locker units together to provide rigid installation.

F. Install end panels, filler panels, and miscellaneous panels.

G. Install accessories.

H. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION 105129

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SECTION 107316.13
METAL CANOPIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Attached metal canopies.

1.02 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2022, with Errata (2025).

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

E. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2025.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

I. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.

J. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2020.

K. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

L. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2024.

M. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2026.

N. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

O. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

P. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit product data sheets, including material descriptions and finishes, and preparation instructions and recommendations.

C. Field Measurement
   1. Confirm dimensions prior to preparation of shop drawings when possible.
   2. If requested, supply manufacturer’s standard literature and specifications for canopies.

3. Submit shop drawings showing structural component locations/positions, material dimensions and details of construction and assembly.

D. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing profiles, sections of components, finishes, and fastening details.

E. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.

F. Designer's Qualification Statement.

G. Manufacturer's Qualification Statement.

H. Erector's Qualification Statement.

I. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

J. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
1. Comply with applicable code for submission of design calculations as required for acquiring permits.
2. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.

B. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
1. Not less than five years of documented experience.

C. Erector Qualifications: Company specializing in performing the work of this section.
1. Not less than five years of documented experience and approved by canopy manufacturer.

D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

E. Canopy must conform to local building codes.

F. Determine if specific load requirements have been established for canopies and if stamped calculations are required for location in which canopy is installed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver materials to project site ready for erection.

C. Package using methods that prevent damage during shipping and storage on site.

D. Store materials under cover and elevated above grade.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Metal Canopies: Correct defective work within a two year period after Date of Substantial Completion.

C. Finish Warranty: Provide manufacturer's five year warranty on factory finish against cracking, peeling, and blistering.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Canopies:
   1. Austin Mohawk and Company, LLC: www.austinmohawk.com/#sle.
   2. Awning and Sign Contractors: www.ascfabricators.com/#sle.
   3. CityScapes Inc: www.cityscapesinc.com/#sle.
   4. Columbus Awning Company: www.columbusawningcompany.com/#sle.
   5. Duo-Gard: www.duo-gard.com.
   6. Form Metal Systems: www.formmetal.com/#sle.
   7. Greco Aluminum Railings: www.grecorailings.com/#sle.
   8. Kingspan Light + Air, LLC: www.kingspanlightandair.us/#sle.
   9. Lawrence Fabric & Metal Structures, Inc: www.lawrencefabric.com/#sle.
   10. Madison Industries: www.madisonind.com.
   11. **Mapes Industries; Super Lumideck: https://mapes.com/#sle.**
   12. Panel Built, Inc: www.panelbuilt.com/#sle.
   13. Peachtree Protective Covers: www.peachtreecovers,com/.
   14. Upside Innovations, a SixAxis company: www.upsideinnovations.com/#sle.
   15. Substitutions: See Section 016000 - Product Requirements.

2.02 METAL CANOPIES

A. Shop Fabricated Aluminum Canopy

B. Configuration: Layout and dimensions, column layout, canopy clearance, fascia profile, and roof covering design as indicated on drawings.
   1. Installation: Cantilever-mounted to building structure with tension members.
   2. Structural Framing System: Aluminum.
   3. Covering Material: Aluminum.
   4. Drainage Concept: Water collected in decking conducted into perimeter drain beams and discharged through downspouts.

C. Performance Requirements:
   1. Design and fabricate metal canopy system to resist wind, snow, live, and seismic loads without failure, damage, or permanent deflection in accordance with ASCE 7:
      a. Loads: As indicated on drawings.
   2. Thermal Movement: Design canopy system to accommodate thermal movement caused by ambient temperature range of 120 degrees F (49 degrees C) and surface temperature range of 180 degrees F (82 degrees C) without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects on assembly components.

2.03 COMPONENTS

A. Structural Aluminum Framing: Alloy and temper 6063-T5, 6063-T6, or 6061-T6.
   1. Extruded Shapes and Tubes: ASTM B221 (ASTM B221M).
   2. Rolled or Extruded Structural Shapes: ASTM B308/B308M.
   3. Extruded Structural Pipe and Tube: ASTM B429/B429M.
   4. Sheet and Plate: Alloy 5052, 5005, or 6061-T651, ASTM B209/B209M.

B. Covering:
   1. Aluminum Decking:
      a. Interlocking extruded aluminum decking modules.
         1) Extruded Decking: ASTM B221 (ASTM B221M), Alloy and temper 6005-T5, 6061-T6, or 6063-T6.
         2) Decking Shall be 2 3/4” Extruded .078” Decking.
      b. Decking Orientation: Parallel to wall.

C. Fascia: Manufacturer's standard flat profile.

D. Anchor Bolts: ASTM A307 or ASTM A572/A572M, formed with bent shank, assembled with template for casting into concrete.

1. Minimum exposed thread of 7 inches (178 mm) above footing and 23 inch (584 mm) minimum embedment.
2. Provide nuts and washers as required for column leveling and plumbing.

E. Hanger rods and attachment hardware shall be powder coated to match canopy. D. Fascia shall be standard 8” extruded “J” style (minimum .125 aluminum).

F. Exposed Gutters and Downspouts: Aluminum with AAMA _____ organic coating, color to match canopy covering, manufacturer's recommended size for canopy specified.

2.04 SHOP FABRICATION

A. Provide a complete system ready for erection at project site.

B. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.

C. Weld steel members in accordance with AWS D1.1/D1.1M.

D. Weld aluminum members in accordance with AWS D1.2/D1.2M.

E. Fabricate connections for bolt, nut, and washer connectors.

2.05 FINISHES

A. Aluminum Framing and Decking:
1. High Performance Organic Coatings: AAMA 2604, multiple coats, thermally cured, fluoropolymer system.
2. Color: As selected by Architect from manufacturer's full range.

B. Fascia: Polyester baked enamel finish; color as selected from manufacturer's standard range.

2.06 ACCESSORIES

A. Structural Bolts: ASTM F3125/F3125M, Grade A325, minimum 3/4 inch (19 mm) diameter.

B. Trim, Closure Pieces, and Flashings: Same material, thickness and finish as sheet metal decking; factory-fabricated to required profiles.
1. Exposed Fasteners: Same finish as panel system.

C. Grout: ASTM C1107/C1107M; non-shrinking; premixed compound consisting of non-metallic aggregate, cement, water-reducing and plasticizing agents.

D. Fasteners, Non-Structural: ASTM F593 stainless steel or ASTM A307 carbon steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and site area for conditions that might prevent satisfactory installation.

B. Verify that foundation, electrical utilities, and placed anchors are in correct position.

C. Verify that bearing surfaces are ready to receive this work.

D. Do not proceed with installation until all conditions are satisfactory.

3.02 INSTALLATION - FRAMING

A. Erect framing in accordance with AISC 303.

B. Installer shall confirm dimensions and elevations to be as shown on drawings provided by Mapes Industries.

C. Erection shall be performed by an approved installer and scheduled after all concrete, masonry and roofing in the area is completed.

D. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation.

E. Do not field cut or alter structural members without approval.

F. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 INSTALLATION - CANOPY COVERING

A. Install in accordance with manufacturer's instructions.

B. Fasten metal decking to metal support members, aligned level and plumb.

C. Install fascia panels, trim, and flashing.

D. Separate dissimilar metals using concealed bituminous paint.

E. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

3.04 TOLERANCES

A. Maximum Variation from Level: Plus/Minus 1/8 inch (3.175 mm).

3.05 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean surfaces of dust and debris; follow manufacturer's cleaning instructions for the finish used.

3.06 PROTECTION

A. Protect canopy after installation to prevent damage due to other work until Date of Substantial Completion.

END OF SECTION 107316.13

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SECTION 112300
COMMERCIAL LAUNDRY EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial Laundry Equipment of the Following Types:
   1. Washers.
   2. Dryings.

1.02 REFERENCE STANDARDS

A. ISO 9001 - Quality Management Systems — Requirements; 2015, with Amendment (2024).

1.03 RELATED SECTIONS

A. Section 22 14 13 - Facility Storm Drainage Piping.

B. Section 22 13 26 - Sanitary Waste Separators.

C. Section 23 11 23 - Facility Natural-Gas Piping.

D. Section 22 31 00 - Domestic Water Softeners.

E. Section 23 30 00 - HVAC Air Distribution.

F. Section 26 05 00 - Common Work Results for Electrical.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

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

C. Shop Drawings: Provide drawings depicting the plan and elevation views of each model specified, with notations for supply and waste line connections, chemical connections, steam supply, electrical connections, handing and any other pertinent placement information. Coordinate with locations found on the Contract Drawings.

D. Verification Samples: For each finish product specified, two samples that depict the actual product, color, and pattern.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: All primary products specified in this section shall be supplied by a single manufacturer with a minimum of (10) ten years of Commercial and Industrial Laundry Equipment Manufacturing experience.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.

C. Certifications:
   1. Washer-Extractors: Listed with CSA, ETL, ISO 9001 and 14001 Quality and Environmental Impact Standards.
   2. Dryers: UL, ETL, CSA Listed.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation. Handle in accordance with manufacturer's recommendations.

1.07 PROJECT CONDITIONS

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

1.08 WARRANTY

A. Warranty: At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
   1. Washer-Extractors
      a. Parts: Three (3) years on all machine parts from date of installation or three and one half (3 1/2) years from date of manufacture; which-ever comes first.
      b. Washer Mainframe, inner cylinder, including shaft and coupler, bearings and seals: Five (5) years from the date of installation or five and one half (5 1/2) years from the date of manufacture; which-ever comes first.
   2. Top load Washers: Three (3) Years on all machine parts from date of installation. Dryers: Three (3) Years on all machine parts from the date of installation.
   3. Ironers:
      a. Heated Roll: Seven (7) years on parts.
      b. Mainframe: Five (5) years on parts.
      c. Machine components (excluding ribbons and Textile Belts): Three (3) years on parts from date of installation or three and one half (3 1/2) years from date of manufacture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: Dexter Laundry; www.dexter.com.

B. Substitutions: Not permitted.

2.02 WASHER-EXTRACTOR (OFCI)

A. Express Plus 0-Series Washer-Extractor:

B. Model: S-975 Softmount.
   1. Capacity:
      a. Weight: 60 lbs (24-25 kg).
      b. Volume: 9 cu ft (254.9 L).
   2. Size / Dimensions:
      a. Cylinder Diameter: 30 inches (762 mm).
      b. Cylinder Depth: 22 inches (559 mm).
      c. Height: 58 inches (1473 mm).
      d. Width: 38 1/4 inches (972 mm).
      e. Depth: 43 inches (1092 mm).
      f. Door Opening: 19 1/4 inches (489 mm).
      g. Floor to Door Height: 21 3/8 inches (567 mm).
      h. Machine Weight: 1250 pounds (589 kg).
   3. Static Load: Static weight with load and water to floor shall not exceed 1,456 pounds (660.4 kg).
   4. Dynamic Load: Dynamic load to floor shall not exceed 460-pounds with a frequency of 16.1 Hz.
   5. Control Type: 0-Series Touch Control.
   6. Mechanical:
      a. Drain: 3 inches (76.2 mm).
      b. Inlets: 3/4 inch (19.05 mm).
      c. Water Pressure: 30 to 120 psi (207-827 kPa).
      d. Water Flow Rate: 12 gal/min (45 l/min).
      e. Motor Power: 6 kW (8.05 HP).
   7. Power: 208-240V/60Hz/Single Phase (standard).
   8. Auxiliary Heating: Electric- 200-240V/60Hz/Three Phase.
      a. Heating Element: 19.5 kW.
   9. Auxiliary Heating: Steam.

a. Steam Pressure: 87 psi (599.84 kPa).
b. Steam Flow: 176 lbs/hr (80 kg/hr).

2.03 DRYING TUMBLERS (OFCI)

A. Express Plus 0-Series Dryer:
1. Cylinder walls, back plate and lifter material: galvanized steel.

B. Model: T-50 Express 0-Series.
1. Capacity: Up to 50 pounds, 15.8 cu ft (447.4 L).
2. Size / Dimensions:
a. Height: 72 1/4 inches (1835 mm).
b. Depth: 48 inches (1219 mm).
c. Width: 34 1/2 inches (876 mm).
d. Door Opening: 25 5/8 inches (651 mm).
e. Floor to Door: 27 1/4 inches (692 mm).
3. Exhaust Diameter: 8 inches (203.2 mm).

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Check surfaces for level prior to installing equipment. If surfaces are not in an acceptable condition, notify the Architect immediately of the condition.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install all hookups in accordance with UPC and NEC requirements.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 112300

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SECTION 123600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for manufactured casework.

1.02 RELATED REQUIREMENTS

A. Section 123200 - Manufactured Wood Casework .

1.03 REFERENCE STANDARDS

A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

C. AWI (QCP) - Quality Certification Program; Current Edition.

D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

F. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

G. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

H. PS 1 - Structural Plywood; 2023.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

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

C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

D. Samples: Submit two samples, 6 by 6 inch (152.4 by 152.4 mm) in size illustrating color and pattern for each floor material for each color specified.

E. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

G. Sustainable Design Submittal: Documentation for sustainably harvested wood-based components.

H. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

I. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

J. NSI Fabricator Qualification: Documentation of Natural Stone Institute Accreditation.

K. Installer's qualification statement.

L. Installation Instructions: Manufacturer's installation instructions and recommendations.

M. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Natural Stone Institute (NSI) Accredited Natural Stone Fabricator; www.naturalstoneinstitute.org/#sle.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

C. Quality Certification:
   1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
   2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
   3. Provide designated labels on shop drawings as required by certification program.
   4. Provide designated labels on installed products as required by certification program.
   5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Solid Surfacing Countertops (SS-1): Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 1/2 inch (12 mm), minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. Manufacturers:
         1) American Bath Group: www.americanbathgroup.com/#sle.
         2) Avonite Surfaces: www.avonitesurfaces.com/#sle.
         3) Dupont: www.corian.com/#sle.
         4) Formica Corporation: www.formica.com/#sle.
         5) LG Hausys America, Inc: www.lghausysusa.com/#sle.
         6) Meganite, Inc: www.meganite.com/#sle.
         7) OnePointe Solutions LLC: www.onepointesolutions.com/#sle.
         8) Relang International, LLC: www.duraseinusa.com/#sle.
         9) **Wilsonart: www.wilsonart.com/#sle. (Basis of Design)**
         10) Substitutions: See Section 016000 - Product Requirements.
      b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
      c. NSF approved for food contact.
      d. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
      e. Color and Pattern: As indicated on drawings.
   3. Other Components Thickness: 1/2 inch (12 mm), minimum.

4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch (32 mm) thick; square edge; use marine edge at sinks.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.
6. Skirts: As indicated on drawings.
7. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.

2.02 MATERIALS

A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

B. Medium Density Fiberboard for Supporting Substrate: ANSI A208.2.

C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

D. Joint Sealant: Mildew-resistant silicone sealant, white.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
1. Join lengths of tops using best method recommended by manufacturer.
2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
2. Height: 4 inches (102 mm), unless otherwise indicated.

C. Solid Surfacing: Fabricate tops up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet (3 mm in 3 m), maximum.

B. Offset From Wall, Countertops: 1/8 inch (3 mm) maximum; 1/16 inch (1.5 mm) minimum.

C. Field Joints: 1/8 inch (3 mm) wide, maximum.

3.05 CLEANING

A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 123600

SECTION 131250
BLEACHER AND PRESS BOX

PART 1 - PERFORMANCE CRITERIA

1.01 SCOPE OF WORK

A. Provide an outdoor permanent bleacher and press box as shown on drawings and detailed in these performance specifications
B. Provide necessary engineering, material, freight and installation, with supervision to provide grandstand seating systems in accordance with the following specifications.

1.02 PERFORMANCE CRITERIA

A. The minimum acceptable standards of design are:

1. Bleachers are elevated per plans. Front Walkway to be 6'-2” deep. Overall length per plans with a mitered front walkway design. Grandstands are a Permanent Galvanized Steel Leg Truss Style system. Total net seating capacity with Handicap seating areas per plans.
2. Standard 8”/24” Rise/run using Tongue and Groove full plank (semi-closed) deck arrangement with closures for a surface closed deck
3. Aisle layout is per plans. There shall be center aisle rails or end aisle rails per code.
4. Handicap seating areas per plans with side and back closure panels.
5. Finishes to be “hot dipped” galvanized on the steel understructure, clear anodized on the seat boards Dur-Kyn Painted finish aluminum riser boards, aisle nosing strips at aisles and stairs color “black”. Perimeter steel railing risers to be hot dipped galvanized, horizontal pipe rails to be clear anodized and utilizes 6 ga. black vinyl chain link fencing.
6. Aluminum footboards added to the standard mill finish is an applied Premium traction coating system. Provide a premium traction finish that achieves a “high traction” rating as defined by the ANSI/NFSI B 101.1 standards with a minimum of .80 slip co-efficiency rating. The premium traction system must be verified, tested and proven. Finishes must prevent any surface oxidation staining. Required on grandstand footboards, stairs and ramps. Standard mill finish does not meet the requirements.

B. Signage

1. Properly label all handicap seating areas

C. Press Box – Steel Framed modular press box 8' deep x 18' wide
D. An AISC certified steel fabricating plant is a requirement of this project for quality control and assurances. See Section Quality Assurance, C.
E. Stairs and ramps per plans and in accordance with State and Local codes and guidelines.

1.03 RELATED WORK/ RELATED SECTION

A. In accordance with plans and specifications:

1. Demolition if required (By G.C.)
2. Concrete Foundations/Pads (By G.C.)

3. Main electrical feed and final hook-up to press box (By Electrical Contractor)
5. Surveying, site preparation and final grading (By G.C.)

1.04 QUALITY ASSURANCE

A. Manufacturers Qualifications:

1. Manufacturers must have a minimum of ten years of experience in the manufacturing of grandstands and press boxes under current company name.
2. Manufacturer must provide five references (if requested) of similar projects within the State of Delaware. References shall include scope of work, contract amount, owner's name and phone numbers, contract completion date and actual completion date. Project need to reference similar construction type and finishes.
3. Manufacturer shall name a local representation/superintendent for the project. Representative is responsible to attend job site meetings, provide sequencing and scheduling information and make decisions on behalf of the manufacturer. Due to the coordination and timeframe of this project, it is imperative that this representative can immediately respond to and evaluate questions, concerns and actions to resolve issues that immediately impact the fabrication and installation of the product or other contractors' abilities to proceed with their work. Resume of representatives needs to be submitted for review and approval upon request.

B. Welders must be AWS certified; manufacturing capabilities in accordance with the governmental agencies having jurisdiction.

C. Steel fabrication to be done in an AISC certified plant in compliance with IBC. A third party AISC approved inspection agency must be hired to complete and properly document these inspections. The agency must disclose any possible conflicts of interest so that objectivity can be confirmed. Certified reports shall be submitted directly to the architect for confirmation. All associated costs shall be inclusive with the manufacturers bid.

D. Installers Qualifications:

1. Factory-trained and experienced in the installation of grandstands.
2. Source Quality Control: Mill Test Certification.
3. Single Source Responsibility: Obtain all of each distinct material required from a single manufacturer.

E. Code Compliance: Provide aluminum bleachers to meet or exceed all State and Local applicable codes and in compliance with the IBC, IBC/ICC National Code and CABO/ANSI A117.1 Barrier Free Sub code, Current Editions.

1.05 SUBMITTALS

A. Product Data: Submit technical data for each distinct type of material, component and accessory indicated.

1. Include information which specifically details physical properties and performance characteristics.

B. Shop Drawings: Manufacturer to submit shop drawings and structural design calculations signed and sealed by a Delaware licensed Professional engineer, and schedules for type, location, quantity and details of all aluminum components required for this project.

1. Indicate on shop drawings that products are in compliance with National IBC Building Code and all other State and Local Codes and Regulations.

2. Concrete designed per American Concrete Institute Guidelines
3. Samples: Submit manufacturer's samples upon request.

C. Certificate: Submit manufacturer's certification that materials furnished comply with requirements indicated and also in compliance with the IBC and IBC/ICC codes along with all other applicable Federal, State and local codes, and that materials meet or exceed test requirements indicated.

1.06 WARRANTY

A. Submit a written warranty signed by the manufacturer, installer, and the contractor, guaranteeing to correct failures for a period of two (2) years after substantial completion, without reducing or otherwise limiting any other rights to correction which owner may have under the contract documents. Failures are defined to include faulty workmanship or faulty materials. Correction may include repair or replacement.

1.07 BUILDING CODES

A. Comply with all applicable which includes but not limited to the following:

1. IBC – International Building Code – Current Edition
2. IBC/ICC Building Code- Current Edition
3. AISC Manual of Steel Construction, 9th Edition
4. Aluminum Association of America Guidelines
5. IBC Accessibility Guidelines Current Edition
6. National Americans with Disabilities Guidelines
7. American Concrete Institute

B. The bleacher shall be designed to support, in addition to its own weight, a uniformly distributed live load of not less than 100 pounds per square foot of gross horizontal projection of the bleacher. And 6 pounds per square foot of dead load on seats, footboards, risers and steel framing.

C. All seat and footboard members shall be designed to support not less than 120 pounds per linear foot. The bleacher shall be designed to resist, with or without live load, horizontal wind load appropriate for local conditions. It shall also be designed to resist, in addition to the live load, sway forces applied to the seats in a direction parallel to the length of the seat planks 24 pounds per liner foot; and, in a direction perpendicular, stresses in aluminum members and connections shall not exceed those specified for Building Type Structures by the Aluminum Association.

D. General: The structure shall be properly braced for wind and construction loads until all structural elements are secured. Lateral and longitudinal bays shall be cross-braced as required. Guardrails shall be of adequate size, location, and height to meet specified codes and designed to carry required loads. Exit stairs and intermediate aisle stairs shall be completely closed, in the direction of travel and shall have a maximum rise of 7” and a minimum tread of 11”.

E. Code Compliance: Submittals shall be based upon specifications and drawings contained in the bid documents. Architect will not review any design or product changes prior to the bid date. Design changes to reduce overall aisle egress calculations or number of stair and ramp exits will not be allowed. All bidders must bid in accordance with these specifications.

1. The Bleacher Contractor shall be responsible to meet the code interpretation provided in the bid documents and modify as required by state or local governmental review boards.
2. Calculations that demonstrate code compliance with egress and exit of aisles, stairs, and ramps are a required submission with approved drawings.

1.08 MAINTENANCE

A. Manufacturer's Recommendations:

1. Owner conduct annual visual inspection and required maintenance of grandstand and press box to assure safe conditions.
2. It is also recommended that a professional engineer, registered architect or certified grandstand representative performs inspections biennially.

PART – 2 MATERIALS

2.01 PRODUCT MANUFACTURERS

A. The Design intent is based on product provided by Southern Bleacher Company (800) 433-0912; Graham TX or approved equal.
B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.
C. Only manufacturers listed here or in an addendum are approved to bid and only in strict accordance with plans and specifications. No substitutions for product will be permitted unless listed in addendum.
D. Bidder and/or contractor will be held financially responsible for adhering to the products specified herein and as detailed on the drawings
E. Only the Architect/Owner reserves the right to accept or approve Bleacher manufacturers.

2.02 GALVANIZED STEEL PERMANENT LEG TRUSS STYLE BLEACHER

A. Product Description - Tongue and Groove Deck full plank – standard closed decking configuration per plans

1. The intent of the product design is to reduce and minimize the deflection of the aluminum deck and allow for future reconfiguration of seating as may be needed. All individual deck members shall be fitted together longitudinally at all tread, front walk and cross walk locations. This design, in ambient conditions, allows for expansion and contraction without damage or deformation of the aluminum deck. All deck members shall be secured with two hold down clips at each structural member.
2. Galvanized steel elevated permanent leg truss style home stand and galvanized steel angle frame visitor stand.
3. Framing is placed with spacing as shown per plans.
4. Front Walkway:

    a. Clear width 60 inches min. from the leading edge of row #1 seat to the railing system.

        1) Grandstand: Elevated per plans.

5. Entry stairs to be firmly anchored to uniformly poured concrete bases.
    a. Stair rise: 7 inches (max) per Building Code with vertical aluminum closure.
    b. Stair tread depth: 11 inches (min) per Building Code with contrasting extruded aluminum aisle nosing at leading edge of each tread.
    c. Guardrails on Stair to be 42 inches above leading edge of step with two- line anodized aluminum rail and filled with 6-gauge black vinyl coated chain link fence (2” mesh).

d. Stairs to have offset handrail extensions on each side of stair. The handgrip portion of handrails shall not be less than 1 1/2 inches or more than 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corner. The top of handrails and handrail extensions shall be placed not less than 34 inches or more than 38 inches above the nosing of treads and landings. Handrails shall be continuous the full length of the stairs and shall extend in the direction of the stair run not less than 12 inches beyond the bottom riser. Ends shall be returned or shall terminate in newel posts or safety terminals. Handrails shall be extruded anodized aluminum.

6. Aisles:

a. Aisles with seating on both sides to have 34-inch high handrail with intermediate rail at approximately 22 inches above tread. Aisles with seating on one side shall have 34-inch high handrail attached to guardrail system. Handrail shall be mounted to provide clearance from guardrail system in accordance with building code.
b. Pre-fabricated anodized aluminum handrails with continuous rounded ends are discontinuous to allow access to seating through a space 22 inches (min.) to 36 inches (max.).

1) Handrails shall connect to decking / riser surface without penetration of the deck system. Any attachment which must have holes drilled through the decking or intermediate step members is not acceptable.
2) If half steps are required, these steps shall be constructed of the same materials as the treads and risers of the grandstands. Ends shall be completely closed and attached with same mechanical fasteners as used for seat brackets. Extruded aluminum contrasting aisle nosing shall be mechanically fastened to the leading edge of each step.

7. Aluminum Decking System:

a. Bleachers: rise per and tread depth per plans.
b. Each seat 17 inches above its respective tread.
c. Decking Arrangement Tongue and Groove Deck Construction- per section plans
d. The seats shall be 2 x 10 flat designed extruded aluminum alloy, 6063-T6 with clear anodized 204R1, AA-M10C22A31, Class II finish. Seats shall have serrations on top side to allow for safety of occupants.
e. The tread system shall be comprised of aluminum extrusions which fit together lengthwise in a male-female shape running the length of the planks. This tongue and groove mechanism will minimize deflection and not separate due to loads being applied to individual planks. The locking mechanism by design shall allow for expansion and contraction of individual planks without effecting performance of the system. Welded deck is not an acceptable product for this project. The rainwater should be able to penetrate the deck and drip to stone base below.
f. The system shall cause the deck planks to react together at all treads and cross walks to live load and form the appearance of a single tread system. By design, this system forms a solid, overlapping tread and riser installation.
g. The nose extrusion at aisles shall allow for a 1” extruded aluminum contrasting nose piece to be flush mounted on the leading edge and shall capture the vertical riser plank in an extruded pocket. The heel extrusion shall have a.70” vertical lip at the rear of the plank to allow for placement of vertical riser plank.
h. These extrusions shall be such that the attachment of the seat brackets, step brackets, mid-aisle rails and all other components is accomplished without deck penetrations at aisle locations.
i. Entry stairs to be a minimum 2 x 11 mill finish aluminum with inset extrusion to accept contrasting nosing member.

j. Ramp planks to be interlocking to resist deflection of live loads.
k. Open ends of planks to be covered with anodized aluminum end caps, securely fastened to the plank.
l. Joint sleeves: Dual joint sleeves to be inserted at each butt joint of each load bearing aluminum plank, and to penetrate 6 inches into each plank at the joint.

10. Guard railing: To be at all sides of bleacher, entry stairs, ramps portals and landings.

    a. Vertical rail risers to be galvanized steel angle 3” x 3” x ¼ (50 ksi) for steel to steel connection and fastened with 3/8” galvanized hardware
    b. Horizontal railing to be anodized aluminum with aluminum cast end plugs at ends of straight runs and/or elbows at corners.
    c. All guards shall be secured to vertical rail members with hot dipped galvanized fasteners and clamps
    d. Railings shall be placed at a minimum of 42” above walkways, entrances and adjacent seat boards.
    e. The barrier material shall include 6 - gauge black vinyl coated chain link fencing, fastened in place with hot dipped galvanized tension bars and aluminum ties.

11. Ramps:

    a. Slope: 1 in 12.
    b. Guardrails to be 42 inches above ramp with two-line anodized aluminum rail and in filled with 6- gauge black vinyl coated chain link fence (2” mesh) and 2 x 6 extruded aluminum toe board.
    c. Handrail: Ramps to have handrail extensions. The handgrip portion of handrails shall not be less than 1 1/2 inches or more than 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corners. The top of handrails and handrail extensions shall be placed not less than 34 inches or more than 38 inches above the ramp surface. Handrails shall be continuous the full length of the ramp and shall extend in the direction of the ramp not less than 12 inches beyond the end of the ramp. Ends shall be returned or shall terminate in newel posts or safety terminals. If returned, rail must be smooth with no external fittings.
    d. Termination: Ramps shall end with smooth transition onto level concrete pad at benchmark elevation. Aluminum plate with end closures required.

12. Handicap provision:

    a. Quantity of wheelchair spaces: as shown on drawings and in full compliance with IBC ADA Standards set forth in National Codes
    b. Riser area adjacent to wheelchair spaces to have intermediate construction so 4-inch sphere cannot pass through opening.
    c. Guardrail: Area directly behind handicap areas shall have two-line anodized aluminum rail attached to the riser members. These rails shall be pre-fabricated to match the appearance of the mid-aisle handrails. A toe rail shall be attached to the base of the rail.

B. Substructures:

1. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.
2. Shop connections are seal welds.
3. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications. Painted and/or powder coated steel does not offer proper protection and is not an acceptable protective finish for this project

4. All hardware shall be hot-dipped galvanized to ASTM A-123, mechanically galvanized or aluminum (aluminum applies to pop rivets, drive rivets, wire ties).
5. A minimum of 3/8” galvanized connection hardware to be used on the substructure

C. Extruded Aluminum:

1. Seat Planks and Railing are extruded aluminum alloy, 6063-T6 with clear anodized 204R1, AA-M10C22A31, Class II finish.
2. Riser planks are extruded aluminum alloy, 6063-T6 with clear anodized finish
3. Tread, stair and ramp planks are extruded aluminum alloy 6063-T6 mill finish
4. Joint Sleeve Assembly to be inserted in flat plank to maintain true alignment in joining together two plank pieces. Extruded aluminum alloy, 6063-T, mill finish.

D. Accessories:

1. Channel End Caps: Aluminum alloy 6063-T6, clear anodized 204R1, AA-M10C22A31, Class II. Mechanically fastened.
2. Cast End Plugs: Aluminum 319 alloy, cast finish. (Required at termination ends of railing)
3. Hardware:

   a. Bolts, Nuts: Hot-dipped galvanized or mechanically galvanized.
   b. Hold-down Clip Assembly: Aluminum alloy 6005A-T6, mill finish.
   c. Structural Hardware: Equal to or greater than hot dipped galvanized ASTM-A307. No connections utilizing high strength bolts are classed as slip critical.
   d. Aisle Nose and Stair Nose: Aluminum alloy, 6063-T6, slip-resistant black painted finish. Mechanically fastened.
   e. Fabrication:

E. Design Load:

1. Live Load: 100 psf gross horizontal projection.
2. Lateral Sway Load: 24 plf seat plank.
3. Perpendicular Sway Load: 10 plf seat plank.
4. Live Load of Seat and Tread Planks: 120 plf.
5. Handrails and Guardrail: Designed to resist a single concentrated load of 200# applied in any direction at any point along the top. Per Florida Building Code.
6. Wind load: Per Florida Building Code.
7. Live load deflection of structural members shall be limited to L/200 of the span.

F. All manufactured connections to be shop welded.

1. Manufactured by certified welders conforming to AWS Standards.

2.03 PRESS BOX WITH STEEL FRAME STRUCTURE

A. Product Description: Flat standard design with steel framing
B. Press box Dimensions: 10’ wide x 42’ long with 6’ landings on both ends.
C. Filming Area/Observation Deck located on Press Box roof.
D. Press box to be of open construction, allowing inspection of electrical wiring, switches and other components without destructive disassembly.
C. Press box to have State of Delaware approvals as needed.
D. Press Box Support Structure:

1. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.
2. Shop connections are seal welds.
3. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications.

E. Press Box: All materials shall be new and shall comply with ASTM specifications.

1. Floor

a. Main support to be a galvanized steel floor frame sized to support structure and metal belly pan for support of insulation.
b. Floor to be INTERLOCK Aluminum Decking System, extruded aluminum alloy 6063-T6, mill finish. Attach Decking System to steel floor frame with mechanical fasteners at end of plank and at intermediate supports. (Tongue & Groove or Standard extrusion is not acceptable.)
c. Insulation: Poly-encapsulated Formaldehyde-free fiberglass building insulation R-13, 3 1/2 inches thick. Batt or roll as manufactured by Johns Manville, or equal.

2. Wall Structure Steel Framing

a. 4 inch x 4 inch x 11 gauge square tubing with maximum span of 14 feet on front wall and maximum span of 6 feet on back wall and 4 inch x 2 1/2 inch x 14 gauge steel "cees" with maximum spacing of 5 feet for all walls with siding. Spans greater than these require engineered calculations for design.
b. Insulation: Poly-encapsulated Formaldehyde-free fiberglass building insulation R-13, 3 1/2 inches thick. Batt or roll as manufactured by Johns Manville, or equal
c. Interior Finish

(a) 1/2 inch vinyl coated gypsum panels, Gold Bond vinyl-surfaced Durasan.
(b) Cove Base: Vinyl 4 inches x .080.

d. Exterior Finish

(a) 26 - gauge prefinished R-Panel paneling as manufactured by MBCI, Signature 200 color series, color to be determined by owner. Vinyl clad siding is not an acceptable product.
(b) Wall panels are attached with #12 TEK screws - 6” O.C. at the top and bottom of the panels. Lap screws are placed at each end of the panels, at the intermediate supports, and at the mid-point between supports (TEK #14). All fasteners to be painted same color as exterior paneling.

3. Roof Structure

a. 4 inch x 4 inch x 11 gauge square tubing with maximum spacing of 6 feet on center and 4 inches x 2 1/2 inches x 14 gauge steel "cees" with maximum spacing of 2 feet on center.
b. Roof: 1/8 inch four way steel plate roof, continuous welded seams coated with acrylic metal primer as manufactured by Coronado and 36 mils of acrylink roof coating as manufactured by Isothermal Protective Coatings, or equal. Plate is welded on both sides of rafters with 1-1/2 inch long 1/8 inch fillet welds on 12 inch centers. Plywood sheathing will not be accepted.
c. Insulation: Poly-encapsulated Formaldehyde-free fiberglass building insulation, R-19 (minimum) 6 inches thick. Batt or roll as manufactured by Johns Manville or equal.
d. Cornice: 26 gauge steel prefinished to match metal siding.

e. Ceiling: 24 inch x 24 inch x 5/8 inch acoustical ceiling tile architectural revealed edge style wind clips and other components as manufactured by USG, or equal.

4. Exterior Doors

   a. Full flush steel construction with hollow or polystyrene core. 18 gauge skin sheets. Dimensions: 3 feet 0 inches x 6 feet 8 inches. Color: Coordinated with press box siding color.
   b. Steel door frame (16 gauge) complete with 1/2 inch threshold and weather-stripping.
   c. Exterior Hardware (Prior to completed fabrication check with the district to verify what core lock system they use): Yale 546F Exterior Trim, or equal. Handles shall be lever type that allows operation without tight grasping or twisting of the wrist. All exterior hardware must accommodate this.
   d. Interior Hardware: Yale 2100 Exit Device, or equal. Handle shall be panic bar that allows for opening without any grasping, twisting or turning.

5. Interior Walls

   a. Framing to be steel galvanized studs (25 gauge) 1 1/4 inch x 3 5/8 inch at maximum 2 feet on center.
   b. Finishes to be consistent with all other interior finishes.

6. Windows

   a. Frame: Extruded aluminum single hung, horizontal sliding unit, thermal break.
   b. Sash: Tilt toward inside for easy cleaning.
   c. Glazing: Clear tempered panes
   d. Dimensions of each unit: Dependent on compartment size. At interior wall locations or structural support locations the dimension between windows shall be no greater than 6 inches.
   e. Finish: Electrostatically applied acrylic enamel.

7. Work Bench

   a. 1 inch thick x 21 inch wide clear anodized aluminum work bench supported by 4 inch x 2 1/2 inch x 14 gauge steel. Countertops heights shall be constructed to allow wheelchair usage at all locations.

8. Painting: Materials equal to. Coronado or equal.

   a. Surfaces: Exterior Door(s), Door Frame(s)

      (1) Primer: Applied by Door Manufacturer.
      (2) Finish: 2 coats acrylic latex semi-gloss enamel applied by press box manufacturer.

   b. Surfaces, Exterior Siding

      (1) Primer: Applied by Siding Manufacturer.
      (2) Finish: Applied by Siding Manufacturer.
      (3) Touchup: If applicable

   c. Surfaces: Wall and Roof Structure

(1) Primer: Coronado DTM Industrial 180-11 acrylic metal primer applied after welding, or equal.

9. Caulking: Sonneborn NP1 - Polyurethane sealant, All temperature, UV resistant, or equal. Silicone products are not acceptable.

10. Electrical Work:

a. Submittal drawing shall indicate devices and circuitry.
b. Fixtures: 2-lamp, 58 or 64 watt fluorescent, 2' x 4' lay-in design as manufactured by Lithonia Lighting, or equal. Fixtures shall be located above countertop and be maximized to full length of compartment space.
c. Wiring to be in EMT, flexible metal conduit or surface raceway. N.E.C. breaker panel to be 100 amp flush or surface mounted on wall with 1 1/4 inch conduit stubbed out bottom of press box or 2 inch rigid conduit to be stubbed out at back wall of press box ready for service line to be connected. (Service line to Press Box is responsibility of Owner).
d. Service line to Press Box (By Electrical Contractor)
e. Electrical outlet(s) installed per NEC shall be standard duty. All outlets shall be surface or flush mounted.
f. Sound, Telephone, Clock, Field Communication: Empty single or double outlet boxes (as required) per N.E.C. with 3/4 inch conduit stubbed out bottom of Press Box for use of Owner. Outlet boxes to be flush mounted into wall. Any wiring completed onsite will be responsibility of such contractor for inspections. Quantity. Two will be provided. Owner shall indicate additional boxes needed.
g. Filming Area/Observation Deck: Weathertight outlet box for cameras. Quantity: One. Owner shall indicate additional outlets needed.

11. Filming Area/Observation Deck

a. Stairs up to roof shall run along back wall of press box with support of same being provided by extended landing platform at bottom and by stub beam attached to press box back wall at top of stairs. No supports from grade are required.

b. Roof guardrailing to be 42” above walking surface around perimeter of deck attached to 5/8 inch galvanized studs to be welded to roof support structure. The guardrailing to include anodized aluminum with 9 gauge galvanized chain link fencing fastened in place with galvanized fasteners and aluminum ties.

12. Provide fire extinguishers at each exit door (2) total.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All work performed by technicians experienced in bleacher seating. Project references may be required to verify the quality of finished projects.
B. Installation with proven experience in the Northeast region. Requirement for a minimum of (3) installer references in for this project of similar size and scope.
C. Project is only to be installed as per approved shop drawings.

3.02 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.03 ERECTION

A. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
B. Do not field cut or alter structural members without approval.

3.04 CLEAN-UP

A. Clean up all debris caused by work of this section removed from site.
B. Upon completion of the work and final inspections, bleacher manufacturer installer shall broom clean the stand removing all loose debris.

END OF SECTION 131250

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SECTION 131250
BLEACHERS, GRANDSTANDS AND PRESS BOX

PART 1 PERFORMANCE CRITERIA

1.01 SCOPE OF WORK

A. Provide outdoor permanent Bleachers, Grandstands, and Press Box as detailed in these performance specifications. Drawings required with bid for clarification of design intent.

B. Provide necessary engineering, material, freight, installation and supervision to provide grandstand seating systems in accordance with the following performance criteria.

1.02 PERFORMANCE CRITERIA

A. The minimum acceptable standards of design are:

1. Grandstand and Bleacher Designs to match design layouts.

- Home Side Football
  - 20 rows by 210’ – I-Beam Grandstand
  - Non-elevated structure,12” riser height and 24” tread depth per row, per plans
  - Interlock fully closed Decking System with secondary gutters
  - Center portal with walkway access above, per plans
  - Aluminum vertical picket rails (Painted Black), along the back of the stand
  - Black vinyl-coated fencing on front, sides and at exits
- Home Side Football Press Box
  - Press box is to be a sloped front “steel-framed” unit
  - 10’ deep by 42’ wide, two-tier press box, per plans
  - Rooftop film platform access by exterior rear stair
  - Full-length rooftop steel frames canopy cover
  - PTAC wall-mounted heat/air-conditioning units
  - Aluminum Vertical picket rails (Painted Black), around the roof platform, exterior access stair and landing platforms
  - Interior finishes per plans
- Visitor Side Football
  - 9 rows by 210’ – Leg Truss Style Grandstand
  - Elevated 48”, 8” riser height and 24” tread depths per row, per plans
  - Tongue-and-groove style decking system, standard closed deck with the use of closure angles, per plans
  - Aluminum vertical picket rails (Painted Black), along the back of the stand
  - Black vinyl-coated fencing on front, sides and at exits
  - Alternate Price – 10’ by 18’ steel-framed press box, per plans
- Auxiliary Field Bleachers
  - (4) non-elevated galvanized steel angle frame units
  - 5 rows by 51’
  - 8” riser height and 24” treads per row
  - Tongue-and-groove style decking system designed as semi-closed
  - Black vinyl-coated fencing at sides and back

- Baseball Field Bleachers
  - Main bleacher is a mitered, non-elevated galvanized steel angle frame unit
  - 7 rows by +-117’ along the back of the miter
  - Secondary bleacher is a non-elevated galvanized steel angle frame unit 3 rows by 51’ long

- Tongue-and-groove style decking system designed as semi-closed
- Black vinyl-coated fencing at sides and back

- Softball Field Bleachers
  - (3) non-elevated galvanized steel angle frame units
  - 7 rows by 33’ long
  - Tongue-and-groove style decking system designed as semi-closed
  - Black vinyl-coated fencing at sides and back

2. Aisle layout is per schematic plans. There shall be center aisle rails or end aisle rails per code.
3. Handicap seating areas per schematic plans and in accordance with local, state and national guidelines.
4. Finishes on all grandstands and bleachers to be “hot dipped” galvanized on the steel understructure, clear anodized on the seat boards. Riser boards to be Dur-Kyn painted finish from standards. Black painted aluminum aisle nosing strips at aisles and stairs risers. Perimeter steel railing risers to be hot dipped galvanized, horizontal pipe rails to be clear anodized and utilizes 6 ga. black vinyl chain link fencing with a 2” mesh pattern. Back of the home and visitor stand and at the home press box to be aluminum vertical picket rails, painted black.
5. Aluminum footboards added to the standard mill finish is an **applied Premium traction coating system**. Provide a premium traction finish that achieves a “high traction” rating as defined by the ANSI/NFSI B 101.1 standards with a minimum of .80 slip co-efficiency rating. The premium traction system must be verified, tested, and proven. Finishes must prevent any surface oxidation staining. Required on grandstand footboards, stairs, and ramps.

B. Signage
   1. Properly label all handicap seating areas

C. Press Box – Type II construction
   1. Press box to be constructed of steel framing.
   3. End viewing glass to match the pitch of the sloped front per plans.
   4. Full-length rooftop filming platform. Entrance to the platform will be by exterior stair extended from the side filming platform
   5. Full-length steel frames roof canopy cover, per plans
   6. Interior finishes shall be listed on the plans you are providing with the bid.

D. An AISC certified steel fabricating plant is a requirement of this project for quality control and assurances. See Section Quality Assurance, C.

E. Stairs and ramps per plans and in accordance with State and Local codes and guidelines.

1.03 RELATED WORK/ RELATED SECTION

A. In accordance with plans and specifications:
   1. Demolition of existing (By G.C.)
   2. Concrete Foundations/Pads (By G.C.)
   3. Main electrical feed and final hook-up to press box (By Electrical Contractor)
   4. Press box Sound System (By Electrical Contractor)
   5. Surveying, site preparation and final grading (By G.C.)
   6. Access to the site for installation equipment and staging (By GC.)

1.04 QUALITY ASSURANCE

A. Manufacturers Qualifications:

1. Manufacturers must have a minimum of ten years of experience in the manufacturing of grandstands and press boxes under current company name.
2. Manufacturer must provide five references of similar projects within the State of Delaware. References shall include scope of work, contract amount, owner's name and phone numbers, contract completion date and actual completion date.

B. Welders must be AWS certified; manufacturing capabilities in accordance with the governmental agencies having jurisdiction.

C. Steel fabrication to be done in an AISC certified plant or in compliance with IBC Chapter 17. A third party AISC approved inspection agency must be hired to complete and properly document these inspections. The agency must disclose any possible conflicts of interest so that objectivity can be confirmed. Certified reports shall be submitted directly to the architect for confirmation. All associated costs shall be inclusive with the manufacturers bid.

D. Installers Qualifications:
1. Factory-trained and experienced in the installation of grandstands.
2. Source Quality Control: Mill Test Certification.
3. Single Source Responsibility: Obtain all of each distinct material required from a single manufacturer.

E. Code Compliance: Provide aluminum bleachers to meet or exceed all State and Local applicable codes and in compliance with the International Building Code and the IBC/ICC National Code and CABO/ANSI A117.1 Barrier Free Sub code, Current Adopted Edition.

1.05 SUBMITTALS

A. Product Data: Submit technical data for each distinct type of material, component and accessory indicated.
1. Include information which specifically details physical properties and performance characteristics.

B. Shop Drawings: Manufacturer to submit shop drawings with the bid. After award submittal drawings should be submitted with structural design calculations signed and sealed by a licensed Professional engineer (state of project location), and schedules for type, location, quantity and details of all aluminum components required for this project.
1. Indicate on shop drawings that products are in compliance with International Building Code and all other State and Local Codes and Regulations.
2. Concrete designed per American Concrete Institute Guidelines
3. Samples: Submit manufacturer's samples upon request.

C. Certificate: Submit manufacturer's certification that materials furnished comply with requirements indicated and also in compliance with the International Building Code along with all other applicable Federal, State and local codes, and that materials meet or exceed test requirements indicated.

1.06 WARRANTY

A. Submit a written warranty signed by the manufacturer, installer, and the contractor, guaranteeing to correct failures for a period of one (1) year after substantial completion, without reducing or otherwise limiting any other rights to correction which owner may have under the contract documents. Failures are defined to include faulty workmanship or faulty materials. Correction may include repair or replacement.

1.07 BUILDING CODES

A. Comply with all applicable which includes but not limited to the following:
1. International Building Code- Current Edition
2. AISC Manual of Steel Construction, 9th Edition
3. Aluminum Association of America Guidelines
4. International Building Code Guidelines for Accessibility, Current Edition
5. American Concrete Institute
6. COMcheck approval required for the Press box using the 2021 energy conservation code

B. The bleacher shall be designed to support, in addition to its own weight, a uniformly distributed live load of not less than 100 pounds per square foot of gross horizontal projection of the bleacher. And 6 pounds per square foot of dead load on seats, footboards, risers and steel framing.

C. All seat and footboard members shall be designed to support not less than 120 pounds per linear foot. The bleacher shall be designed to resist, with or without live load, horizontal wind load appropriate for local conditions. It shall also be designed to resist, in addition to the live load, sway forces applied to the seats in a direction parallel to the length of the seat planks 24 pounds per liner foot; and, in a direction perpendicular, stresses in aluminum members and connections shall not exceed those specified for Building Type Structures by the Aluminum Association.

D. General: The structure shall be properly braced for wind and construction loads until all structural elements are secured. Lateral and longitudinal bays shall be cross-braced as required. Guardrails shall be of adequate size, location, and height to meet specified codes and designed to carry required loads. Exit stairs and intermediate aisle stairs shall be completely closed, in the direction of travel and shall have a maximum rise of 7” and a minimum tread of 11”.

E. Code Compliance: Submittals shall be based upon specifications and drawings contained in the bid documents. Architect will not review any design or product changes prior to the bid date. Design changes to reduce overall aisle egress calculations or number of stair and ramp exits will not be allowed. All bidders must bid in accordance with these specifications.
   1. The Bleacher Contractor shall be responsible to meet the code interpretation provided in the bid documents and modify as required by state or local governmental review boards.
   2. Calculations that demonstrate code compliance with egress and exit of aisles, stairs, and ramps are a required submission with approved drawings.

1.08 MAINTENANCE

A. Manufacturer's Recommendations:
   1. Owner conduct annual visual inspection and required maintenance of grandstand and press box to assure safe conditions.
   2. It is also recommended that a professional engineer, registered architect or certified grandstand representative performs inspections biennially.

PART - 2

2.01 PRODUCT MANUFACTURERS

A. The intent of this specification is to only allow for bidders that can prove they meet the performance criteria. The basis of Design is **Southern Bleacher Company**, Graham TX

B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.

C. Manufacturers bidding will be held financially responsible for adhering to the products performance criteria herein. No additional money will be allocated after award, nor will consideration given for non-compliance with the specified products.

D. Only the Architect/Owner reserves the right to accept or approve Bleacher manufacturers.

2.02 GALVANIZED STEEL CLEAR SPAN I-BEAM GRANDSTAND HOME FOOTBALL, LEG TRUSS STYLE VISITOR FOOTBALL, AUXILIARY FIELD – BASEBALL – SOFTBALL FIELDS ARE ANGLE FRAME PER THE LISTING ABPVE IN THE SPECIFICATIONS.

A. Product Description HOME SIDE FOOTBALL–
   1. The intent of the product design is to reduce and minimize the deflection of the aluminum deck and allow for future reconfiguration of seating as may be needed. All individual deck members shall be fitted together longitudinally at all tread, front walk and cross walk locations. This design, in ambient conditions, allows for expansion and contraction without

damage or deformation of the aluminum deck. All deck members shall be secured with two hold down clips at each structural member.

2. Galvanized steel non-elevated permanent I-Beam home grandstand
3. Framing and spacing of all columns to follow the drawings. Crossbracing will be within every other bay starting with the end section.
4. Front Walkway:
   a. Grandstand is non-elevated on the home side.
5. Entry stairs (visitor side) to be firmly anchored to uniformly poured concrete bases.
   a. Stair rise: 7 inches (max) per Building Code with vertical aluminum closure.
   b. Stair tread depth: 11 inches (min) per Building Code with contrasting extruded aluminum aisle nosing at leading edge of each tread.
   c. Guardrails on Stair to be 42 inches above leading edge of step with two- line anodized aluminum rail and filled with 6-gauge black vinyl coated chain link fence (2” mesh). Back row of football home and visitor to be aluminum vertical picket rails painted black.
   d. Stairs to have offset handrail extensions on each side of stair. The handgrip portion of handrails shall not be less than 1 1/2 inches or more than 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corner. The top of handrails and handrail extensions shall be placed not less than 34 inches or more than 38 inches above the nosing of treads and landings. Handrails shall be continuous the full length of the stairs and shall extend in the direction of the stair run not less than 12 inches beyond the bottom riser. Ends shall be returned or shall terminate in newel posts or safety terminals. Handrails shall be extruded anodized aluminum.
6. Aisles:
   a. Aisles with seating on both sides to have 34-inch high handrail with intermediate rail at approximately 22 inches above tread. Aisles with seating on one side shall have 34-inch high handrail attached to guardrail system. Handrail shall be mounted to provide clearance from guardrail system in accordance with building code.
   b. Pre-fabricated anodized aluminum handrails with continuous rounded ends are discontinuous to allow access to seating through a space 22 inches (min.) to 36 inches (max.).
      1) Handrails shall connect to decking / riser surface without penetration of the deck system. Any attachment which must have holes drilled through the decking or intermediate step members is not acceptable.
      2) If half steps are required, these steps shall be constructed of the same materials as the treads and risers of the grandstands. Ends shall be completely closed and attached with same mechanical fasteners as used for seat brackets. Extruded aluminum contrasting aisle nosing shall be mechanically fastened to the leading edge of each step.
7. Aluminum Decking System:
   a. Bleachers: rise per and tread depth per plans.
   b. Each seat 17 inches above its respective tread.
   c. Decking arrangement: interlock decking for the home grandstand per section plans; tongue-and-groove for all other bleachers with angle closures on the visitor side only.
   d. The seats shall be 2 x 10 flat designed extruded aluminum alloy, 6063-T6 with clear anodized 204R1, AA-M10C22A31, Class II finish. Seats shall have serrations on top side to allow for safety of occupants.
   e. The intent of the product design is to reduce deflection of aluminum deck and to minimize fluid drainage below spectator seating.
   f. All individual deck members shall be locked together longitudinally at all treads, front walk and cross walk locations. Decking to be pitched with a ½% slope.
   g. This design, in ambient conditions, allows for expansion and contraction without damage or deformation of the aluminum deck.

h. The locking design does not allow any fluids to pass to the ground under the spectator seating.
i. The system shall cause the deck planks to react together at all treads and cross walks to live load and form the appearance of a single tread system. By design, this system forms a solid, overlapping tread and riser installation.
j. The nose extrusion at aisles shall allow for a 1" extruded aluminum contrasting nose piece to be flush mounted on the leading edge and shall capture the vertical riser plank in an extruded pocket. The heel extrusion shall have a .70" vertical lip at the rear of the plank to allow for placement of vertical riser plank.
k. These extrusions shall be such that the attachment of the seat brackets, step brackets, mid-aisle rails and all other components is accomplished without deck penetrations at aisle locations.
l. The system shall allow for seat and aisle reconfiguration at any time without evidence of its previous configuration.
m. **A secondary gutter (home side only) placed below footboard butt joints shall consist of doubling the stringers at these locations and placing a galvanized formed gutter between the stringers placed approximately 12" apart. The gutter starts at the top of the stand and terminates at a collector box just below row #1. Transferring the water from the collector box to the site drainage location will be the responsibility of the general pr site contractor.**
n. Entry stairs to be a minimum 2 x 11 mill finish aluminum with inset extrusion to accept contrasting nosing member.
o. Ramp planks to be interlocking to resist deflection of live loads.
p. Open ends of planks to be covered with anodized aluminum end caps, securely fastened to the plank.
q. Joint sleeves: Dual joint sleeves to be inserted at each butt joint of each load bearing aluminum plank, and to penetrate 6 inches into each plank at the joint.

10. Guard railing: To be at all sides of bleacher, entry stairs, ramps portals and landings.
    a. Vertical rail risers to be galvanized steel angle 3" x 3" x ¼ (50 ksi) for steel to steel connection and fastened with 3/8" galvanized hardware
    b. Horizontal railing to be anodized aluminum with aluminum cast end plugs at ends of straight runs and/or elbows at corners.
    c. All guards shall be secured to vertical rail members with hot dipped galvanized fasteners and clamps
    d. Railings shall be placed at a minimum of 42" above walkways, entrances and adjacent seat boards.
    e. The barrier material shall include 6 - gauge black vinyl-coated chain-link fencing, fastened in place with hot-dip galvanized tension bars and aluminum ties.
    f. As noted the back of the home and visitor football stands has aluminum vertical picket rails painted black. Rail risers are galvanized and horizontal pipe is clear anodized aluminum.
11. Ramps:
    a. Slope: 1 in 12.
    b. Guardrails to be 42 inches above ramp with two-line anodized aluminum rail and in filled with 6- gauge black vinyl coated chain link fence (2" mesh) and 2 x 6 extruded aluminum toe board.
    c. Handrail: Ramps to have handrail extensions. The handgrip portion of handrails shall not be less than 1 1/2 inches or more than 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corners. The top of handrails and handrail extensions shall be placed not less than 34 inches or more than 38 inches above the ramp surface. Handrails shall be continuous the full length of the ramp and shall extend in the direction of the ramp not less than 12 inches beyond the end of the ramp. Ends shall be returned or shall terminate in newel posts or safety terminals. If returned, rail must be smooth with no external fittings.

d. Termination: Ramps shall end with smooth transition onto level concrete pad at benchmark elevation. Aluminum plate with end closures required.

12. Handicap provision:
    a. Quantity of wheelchair spaces: as shown on drawings and in full compliance with ADA Standards set forth in International Building Code Accessibility Regulations
    b. Riser area adjacent to wheelchair spaces to have intermediate construction so 4-inch sphere cannot pass through opening.
    c. Guardrail: Area directly behind handicap areas shall have two-line anodized aluminum rail attached to the riser members. These rails shall be pre-fabricated to match the appearance of the mid-aisle handrails. A toe rail shall be attached to the base of the rail.

B. Substructures:
1. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.
2. Shop connections are seal welds.
3. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications. Painted and/or powder coated steel does not offer proper protection and is not an acceptable protective finish for this project
4. All hardware shall be hot-dipped galvanized to ASTM A-123, mechanically galvanized or aluminum (aluminum applies to pop rivets, drive rivets, wire ties).
5. A minimum of 3/8” galvanized connection hardware to be used on the substructure

C. Extruded Aluminum:
1. Seat Planks and Railing are extruded aluminum alloy, 6063-T6 with clear anodized 204R1, AA-M10C22A31, Class II finish.
2. Riser planks and continuous aluminum backrests are extruded aluminum alloy, 6063-T6 with Dur-Kyn painted finish, per location on plans.
3. Tread, stair and ramp planks are extruded aluminum alloy 6063-T6 mill finish
4. Joint Sleeve Assembly to be inserted in flat plank to maintain true alignment in joining together two plank pieces. Extruded aluminum alloy, 6063-T, mill finish.

D. Accessories:
1. Channel End Caps: Aluminum alloy 6063-T6, clear anodized 204R1, AA-M10C22A31, Class II. Mechanically fastened.
2. Cast End Plugs: Aluminum 319 alloy, cast finish. (Required at termination ends of railing)
3. Hardware:
    a. Bolts, Nuts: Hot-dipped galvanized or mechanically galvanized.
    b. Hold-down Clip Assembly: Aluminum alloy 6005A-T6, mill finish.
    c. Structural Hardware: Equal to or greater than hot dipped galvanized ASTM-A307. No connections utilizing high strength bolts are classed as slip critical.
    d. Aisle Nose and Stair Nose: Aluminum alloy, 6063-T6, slip-resistant black painted finish. Mechanically fastened.
    e. Fabrication:

E. Design Load:
1. Live Load: 100 psf gross horizontal projection.
2. Lateral Sway Load: 24 plf seat plank.
3. Perpendicular Sway Load: 10 plf seat plank.
4. Live Load of Seat and Tread Planks: 120 plf.
5. Handrails and Guardrail: Designed to resist a single concentrated load of 200# applied in any direction at any point along the top. Per the Internaitonal Building Code.
6. Wind load: Per State and Local Building Code.
7. Liveload deflection of structural members shall be limited to L/200 of the span.

F. All manufactured connections to be shop welded.

1. Manufactured by certified welders conforming to AWS Standards.

2.03 PRESS BOX WITH STEEL FRAME CONSTRUCTION WITH TWO INTERIOR LEVELS

A. Product Description: Steel Frame Construction.

B. Press box Dimensions: (10) feet wide x (42) feet long

C. Press box to be constructed with rear exterior stair access to filming platform

D. Special Inspections- third party inspection to be completed and documented at the fabrication facility in accordance with PA Regulations.

E. Press Box Support Structure:
   1. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.
   2. Shop connections are seal welds.
   3. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications.

F. Press Box: All materials shall be new and shall comply with ASTM specifications.
   1. Floor
      a. Main support to be a galvanized steel floor frame sized to support structure and metal belly pan for support of insulation.
      b. Floor to be INTERLOCK Aluminum Decking System, extruded aluminum alloy 6063-T6. Attach Decking System to steel floor frame with mechanical fasteners at end of plank and at intermediate supports. Wood/plywood base decking has proven to deteriorate over time and is not an acceptable alternative.
      c. Insulation: Kraft faced fiberglass building insulation thickness in compliance with 2015 energy conservation code. Batt or roll as manufactured by Owens-Corning Fiberglass Corp., or equal.
      d. Wall Structure Steel Framing
         1) 4 inch x 4 inch x 11 gauge square tubing with maximum span of 14 feet on front wall and maximum span of 6 feet on back wall and 4 inch x 2 1/2 inch x 14 gauge steel "cees" with maximum spacing of 5 feet for all walls with siding. Spans greater than these require engineered calculations for design.
         2) Insulation: Kraft faced fiberglass building insulation R-11, 3 ½ inches thick. Batt or roll as manufactured by Owens-Corning Fiberglass Corp., or equal. Insulation shall be in accordance with the 2021 International Energy Conservation code.
         3) Interior Finish
            (a) 1/2 inch vinyl coated gypsum panels, Gold Bond vinyl-surfaced
            (b) Cove Base: Vinyl 4 inches x.080 color to be medium gray.
         4) Exterior Finish
            (a) 26 - gauge prefinished R-Panel paneling as manufactured by MBCI, Signature 200 color series, color to be determined. Vinyl clad siding is not an acceptable product.
            (b) Wall panels are attached with #12 TEK screws - 6” O.C. at the top and bottom of the panels. Lap screws are placed at each end of the panels, at the intermediate supports, and at the mid-point between supports (TEK #14). All fasteners to be painted same color as exterior paneling.
      e. Roof Structure
         1) 4 inch x 4 inch x 11 gauge square tubing with maximum spacing of 6 feet on center and 4 inches x 2 1/2 inches x 14 gauge steel "cees" with maximum spacing of 2 feet on center.
         2) Roof: 1/8 inch four way steel plate roof, continuous welded seams coated with acrylic metal primer as manufactured by Coronado and 36 mils of acrylink roof coating as manufactured by Isothermal Protective Coatings, or equal. Plate is welded on both sides of rafters with 1-1/2 inch long 1/8 inch fillet welds on 12 inch centers. Plywood sheathing will not be accepted.
         3) Insulation: Kraft faced fiberglass building insulation, R-19 (minimum) 6 inches thick. Batt or roll as manufactured by Owens-Corning Fiberglas Corp., or equal.

4) Cornice: 26 gauge steel prefinished- color to be determined.
5) Ceiling: 24 inch x 24 inch x 5/8 inch acoustical ceiling tile architectural revealed edge style wind clips and other components as manufactured by USG, or equal.

f. Exterior Doors
1) Full flush steel construction with honeycomb core. 18 gauge skin sheets. Dimensions: 3 feet 0 inches x 6 feet 8 inches. Color: White.
2) Steel door frame (16 gauge) complete with 1/2 inch threshold and weather-stripping.
3) Exterior Hardware (Prior to completed fabrication check with the district to verify what core lock system they use): Yale 546F Exterior Trim, or equal. Handles shall be lever type that allows operation without tight grasping or twisting of the wrist. All exterior hardware must accommodate this.
4) Interior Hardware: Yale 2100 Exit Device, or equal. Handle shall be panic bar that allows for opening without any grasping, twisting or turning.
5) Interior Walls
(a) Framing to be steel galvanized studs (25 gauge) 1 1/4 inch x 3 5/8 inch at maximum 2 feet on center.
(b) Finishes to be consistent with all other interior finishes.
(c) A 24” x 56” interior window in each wall.

g. Windows
1) Frame: Extruded aluminum single hung, vertical sliding unit, thermal break.
2) Sash: Tilt toward inside for easy cleaning.
3) Glazing: Clear tempered panes.
4) Dimensions of each unit: Dependent on compartment size. At interior wall locations or structural support locations the dimension between windows shall be no greater than 6 inches.
5) Finish: Electrostatically applied acrylic enamel.

h. Work Bench
1) 18 inch deep clear anodized aluminum countertop with a radius front edge.
2) Support using 4” x 2” x 14 ga. Steel “cee” on 4” x 4” x 11 ga. Sq. tubing welded to steel.
3) Shelf brackets do not provide proper support and are not acceptable.

i. Painting: Materials equal to. Coronado or equal.
1) Surfaces: Exterior Door(s), Door Frame(s)
(a) Primer: Applied by Door Manufacturer.
(b) Finish: 2 coats acrylic latex semi-gloss enamel applied by press box manufacturer.
2) Surfaces, Exterior Siding
(a) Primer: Applied by Siding Manufacturer.
(b) Finish: Applied by Siding Manufacturer.
(c) Touchup: If applicable
3) Surfaces: Wall and Roof Structure
(a) Primer: Coronado DTM Industrial 180-11 acrylic metal primer applied after welding, or equal.

j. Caulking: Sonneborn NP1 - Polyurethane sealant, All temperature, UV resistant, or equal. Silicone products are not acceptable.

k. Electrical Work:
1) Submittal drawing shall indicate devices and circuitry.
2) Fixtures: Recessed Edgelit LED panel light fixture for use in grid ceiling systems.
3) Wiring to be in nonmetallic Panduit, or equal. N.E.C. breaker box to be 100 amp service mounted on wall with 2 inch rigid conduit to be stubbed out at back wall of press box ready for service line to be connected.
4) Service line to Press Box (By Electrical Contractor)
5) Electrical outlet(s) installed per NEC shall be standard duty.

(a) All outlets shall be surface mounted on wall.

6) Sound, Telephone, Clock, Field Communication: Empty double outlet boxes per N.E.C. with 3/4 inch conduit stubbed out bottom of Press Box. Electrical contractor is responsible for re-connecting all electric, telecommunications and audio visual wiring, conduit and equipment to the press box.
7) Outlet boxes to be flush mounted into wall. Any wiring completed on-site will be responsibility of such contractor for inspections. Quantity per plans.
8) Provide wall mountedPTAC heat/air conditioning wall mounted units per plans
10) Provide in each room an emergency combination exit/flood light with battery back-up. Also provide exterior emergency light with remote heads.
11) Provide (2) wall mount exterior lights with photocell

l. Provide fire extinguishers at each exit door (2) total.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All work performed by technicians experienced in bleacher seating. Project references may be required to verify the quality of finished projects.

B. Installation with proven experience in the northeast region. Requirement for a minimum of (3) installer references in for this project of similar size and scope.

C. Project is only to be installed as per approved shop drawings.

3.02 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.03 ERECTION

A. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.

B. Do not field cut or alter structural members without approval.

3.04 CLEAN-UP

A. Clean up all debris caused by work of this section removed from site.

B. Upon completion of the work and final inspections, bleacher manufacturer installer shall broom clean the stand removing all loose debris.

END OF SECTION 13125

SECTION 133419
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufacturer-engineered, shop-fabricated structural steel building frame.

B. Metal wall and roof panels including soffits and gutters and downspouts.

1.02 RELATED REQUIREMENTS

A. Section 055000 - Metal Fabrications.

B. Section 079200 - Joint Sealants: Sealing joints between accessory components and wall system.

C. Section 081113 - Hollow Metal Doors and Frames.

D. Section 083613 - Sectional Doors.

E. Section 084313 - Aluminum-Framed Storefronts

1.03 REFERENCE STANDARDS

A. AISC 360 - Specification for Structural Steel Buildings; 2022, with Errata (2025).

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

G. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2026.

H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

I. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2023.

J. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

K. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

M. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

N. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2026.

O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

P. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

R. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2024, with Editorial Revision (2025).

S. MBMA (MBSM) - Metal Building Systems Manual; 2024.

T. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

U. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on profiles, component dimensions, fasteners.

C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchors and methods of anchorage, and installation; framing anchor bolt settings, sizes, locations from datum, and foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

D. Samples: Submit two samples of precoated metal panels for each color selected, 12 by 12 inch (304.8 by 304.8 mm) in size illustrating color and texture of finish.

E. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement.

F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

G. Designer's Qualification Statement.

H. Manufacturer's Qualification Statement: Provide documentation showing metal building manufacturer is accredited under IAS AC472.
   1. Include statement that manufacturer designs and fabricates metal building system as integrated components and assemblies, including but not limited to primary structural members, secondary members, joints, roof, and wall cladding components specifically designed to support and transfer loads and properly assembled components form a complete or partial building shell.

I. Erector's Qualification Statement.

J. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

K. Project Record Documents: Record actual locations of concealed components and utilities.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this type of work.
   1. Design Engineer Qualifications: Licensed in the State in which the Project is located.
   2. Comply with applicable code for submission of design calculations as required for acquiring permits.
   3. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.

B. Perform work in accordance with AISC 360 and MBMA (MBSM).
   1. Maintain one copy on site.

C. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
   1. Not less than three years of documented experience.
   2. Accredited by IAS in accordance with IAS AC472.

D. Erector Qualifications: Company specializing in performing the work of this section approved by manufacturer.

E. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

1.07 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty for exterior wall and roof panels and interior liner panels .

1. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Buildings Systems:

1. **Butler Manufacturing Company; Tier I Classic: www.butlermfg.com/#sle. (Basis of Design)**
2. Ceco Building Systems: www.cecobuildings.com/#sle.
3. Chief Buildings: www.chiefbuildings.com/#sle.
4. Kirby Building Systems, a Nucor Company: www.kirbybuildingsystems.com/#sle.
5. Metallic Building Systems: www.metallic.com/#sle.
6. Nucor Building Systems: www.nucorbuildingsystems.com/#sle.
7. Red Dot Buildings: www.reddotbuildings.com/#sle.
8. VP Buildings: www.vp.com/#sle.
9. Substitutions: See Section 016000 - Product Requirements.

2.02 ASSEMBLIES

A. Single span rigid frame.

B. Bay Spacing: AS indicated on drawings.

C. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, braced end frames, and end wall columns, and wind bracing.

D. Secondary Framing: Purlins, Girts, and Eave struts, and other items detailed.

E. Wall System: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly, and accessory components.

F. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly, insulation, and liner panels, and accessory components.

G. Roof Slope: 2 inches in 12 inches (1/6).

2.03 PERFORMANCE REQUIREMENTS

A. Installed Thermal Resistance of Wall System: R-value of ____ (RSI-value of ____).

B. Installed Thermal Resistance of Roof System: R-value of ____ (RSI-value of ____).

C. Design structural members to withstand dead load, applicable snow load, and design loads due to pressure and suction of wind calculated in accordance with applicable code.

D. Design structural members to withstand Class 30 wind uplift in accordance with UL 580.

E. Exterior wall and roof system shall withstand imposed loads with maximum allowable deflection of 1/90 of span.

F. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

G. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of ____ degrees F (____ degrees C).

H. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

2.04 MATERIALS - FRAMING

A. Structural Steel Members: ASTM A36/A36M.

B. Structural Tubing: ASTM A500/A500M Grade B cold-formed.

C. Plate or Bar Stock: ASTM A529/A529M, Grade 50.

D. Anchor Bolts: ASTM A307, Grade A, with hot dip type for protective coatings.

E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1; galvanized to ASTM A153/A153M.

F. Welding Materials: Perform in accordance with AWS D1.1/D1.1M.

G. Primer: SSPC-Paint 20 zinc rich.

H. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch (13.7 MPa).
2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch (48 MPa).
3. Height Change, Plastic State: When tested in accordance with ASTM C827/C827M:
   a. Maximum: Plus 4 percent.
   b. Minimum: Plus 1 percent.

2.05 MATERIALS - WALLS AND ROOF

A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Designation SS (structural steel), Grade 33 (230), with G90/Z275 coating.

B. Insulation: Roll glass fiber type, faced with reinforced white vinyl, ASTM E84 Class A, flame spread index of 25 or less where exposed, friction fit, ____ inches (____ mm) thick.

C. Metal Building Type, Factory Applied, Vapor-Barrier Insulation Facings: Water vapor permeance no greater than 0.10 perm (5.7 ng/(Pa s sq m)) when tested in accordance with ASTM E96/E96M; flame spread index of 25 or less, and smoke developed index of 40 or less when tested in accordance with ASTM E84.

D. Joint Seal Gaskets: Manufacturer's standard type.

E. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.

F. Bituminous Paint: Asphaltic type.

G. Sealant: ASTM C920, elastomeric sealant with movement capability of at least plus/minus 50 percent; 100 percent silicone; for exposed applications, match adjacent colors as closely as possible.

H. Metal Mesh: Galvanized steel wire, woven.

I. Roof Curbs: Insulated metal same as roofing, ____ inch (____ mm) thick, designed for imposed equipment loads, anchor fasteners to equipment, counterflashed to metal roof system.

J. Trim, Closure Pieces, Caps, Flashings, Gutters, Downspouts, Rain Water Diverter, Fascias, and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

2.06 COMPONENTS

A. Doors and Frames: See Section 081113.

B. Overhead Doors: See Section 083613.

C. Overhead Door Frame: Formed steel sections braced to building frame; see Section 055000.

D. Windows: See Section 084313.

E. Snow Guards: See Section 077200.

2.07 FABRICATION - FRAMING

A. Fabricate members in accordance with AISC 360 for plate, bar, tube, or rolled structural shapes.

B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.

C. Provide wall opening framing for doors, windows, and other accessory components.

2.08 FABRICATION - WALL AND ROOF PANELS

A. Siding: Minimum ____ inch (____ mm) metal thickness, ____ profile indicated, ____ inch (____ mm) deep, lapped edges fitted with continuous gaskets.

B. Roofing: Minimum ____ inch (____ mm) metal thickness, ____ profile, lapped edges fitted with continuous gaskets.

C. Liner: Minimum ____ inch (____ mm) metal thickness, flat profile indicated, lapped V edges fitted with continuous gaskets.

D. Girts/Purlins: Rolled formed structural shape to receive siding, roofing and liner sheet.

E. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles. Back brace mitered internal corners with ____ inch (____ mm) thick sheet.

F. Expansion Joints: Same material and finish as adjacent material where exposed, ____ inch (____ mm) thick, manufacturer's standard brake formed type, of profile to suit system.

G. Flashings, Closure Pieces, Fascia: Same material and finish as adjacent material, profile to suit system.

H. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

2.09 FABRICATION - GUTTERS AND DOWNSPOUTS

A. Fabricate of same material and finish as roofing metal.

B. Form gutters and downspouts of _____ profile and size indicated to collect and remove water. Fabricate with connection pieces.

C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.

D. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.10 FINISHES

A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.

B. Exterior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.

C. Interior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.02 ERECTION - FRAMING

A. Erect framing in accordance with AISC 360.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.

C. Set column base plates with non-shrink grout to achieve full plate bearing.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION - WALL AND ROOF PANELS

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding system to structural supports, aligned level and plumb.

D. Locate end laps over supports. End laps minimum 2 inches (50 mm). Place side laps over bearing.

E. Provide expansion joints where indicated.

F. Use concealed fasteners.

G. Install insulation and vapor retarder utilizing _____ for attachment.

H. Install sealant and gaskets, providing weather tight installation.

3.04 ERECTION - GUTTERS AND DOWNSPOUTS

A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Apply bituminous paint on surfaces in contact with cementitious materials.

C. Slope gutters minimum ____ inch/ft (____ mm/m).

D. Connect downspouts to storm sewer system.

3.05 INSTALLATION - ACCESSORY COMPONENTS IN WALL SYSTEM

A. Install door frames, doors, overhead doors, and windows and glass in accordance with manufacturer's instructions.

3.06 TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from level; 1/8 inch (3 mm) from plumb.

B. Siding and Roofing: 1/8 inch (3 mm) from true position.

END OF SECTION 133419